OmniStream™ R-Type
Single-Channel Networked AV Decoder

Version Information

Version	Release Date	Notes
13	Jan 2024	Updated warranty information

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Operating Notes

⚠️ **IMPORTANT:** Visit http://www.atlona.com/product/AT-OMNI-521 for the latest firmware updates and User Manual.

Warranty

To view the product warranty, use the following link or QR code:

https://atlona.com/warranty/.

Important Safety Information

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCT THE RISK OF
ELECTRIC SHOCK
DO NOT OPEN ENCLOSURE OR EXPOSE
TO RAIN OR MOISTURE.
NO USER-SERVICEABLE PARTS
INSIDE REFER SERVICING TO
QUALIFIED SERVICE PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product.

The information bubble is intended to alert the user to helpful or optional operational instructions in the literature accompanying the product.

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this product near water.

6. Clean only with a dry cloth.

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of a polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the product.

11. Only use attachments/accessories specified by Atlona.

12. To reduce the risk of electric shock and/or damage to this product, never handle or touch this unit or power cord if your hands are wet or damp. Do not expose this product to rain or moisture.

13. Unplug this product during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the product has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the product, the product has been exposed to rain or moisture, does not operate normally, or has been dropped.

FCC Compliance

FCC Compliance and Advisory Statement: This hardware device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment to an outlet on a circuit different from that to which the receiver is connected; 4) consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

Copyright, Trademark, and Registration

Table of Contents

Introduction

The Atlona **OmniStream™ 521** (**AT-OMNI-521**) is a networked AV decoder for an OmniStream-encoded video stream up to UHD @ 60 Hz and HDR, plus embedded audio and RS-232 or IR control pass-through. It is part of the **OmniStream R-Type Series**, designed for high performance, flexible distribution of AV over Gigabit Ethernet in residential and commercial applications. The OmniStream 521 is HDCP 2.2 compliant and ideal for the latest as well as emerging UHD and HDR displays. It features visually lossless compression, optimized for motion video, pristine-quality imaging, and extremely low, sub-frame latency from encode to decode – critical for demanding applications such as gaming. This decoder includes an HDMI output, high performance upscaling and downscaling, aspect ratio control, and video wall processing, plus presentation enhancement features such as logo insertion and scrolling on-screen text

Features

- AV decoder for HDMI® up to 4K/UHD, plus embedded audio and RS-232 or IR control pass-through
- Supports UHD @ 60 Hz plus HDR formats
- High performance, visually lossless video compression
- Pristine-quality downscaling and upscaling
- Simplify integration with plug-and-play network switch compatibility
- Remotely powered via PoE (Power over Ethernet)
- Video wall processing
- Enhance AV presentations with visual enhancements

Package Contents

1 x AT-OMNI-521
1 x Push spring connector, 6-pin
2 x Wall/table mounting brackets
4 x Rubber feet

Introduction to OmniStream

OmniStream 101

OmniStream products are similar in principle to matrix switch endpoints: A/V signals are sent from one point (transmitter) to another point (receiver) over category cable. However, OmniStream stands apart from matrix switchers, in that it is an *IP-based solution*, allowing this data to be sent over a standard IP network. In addition, these endpoints are referred to as *encoders* and *decoders*. Encoders act as "transmitters" and decoders act as "receivers".

> **DEFINITIONS**
>
> *Encoder* – Compresses source signals before sending them out over a network environment.
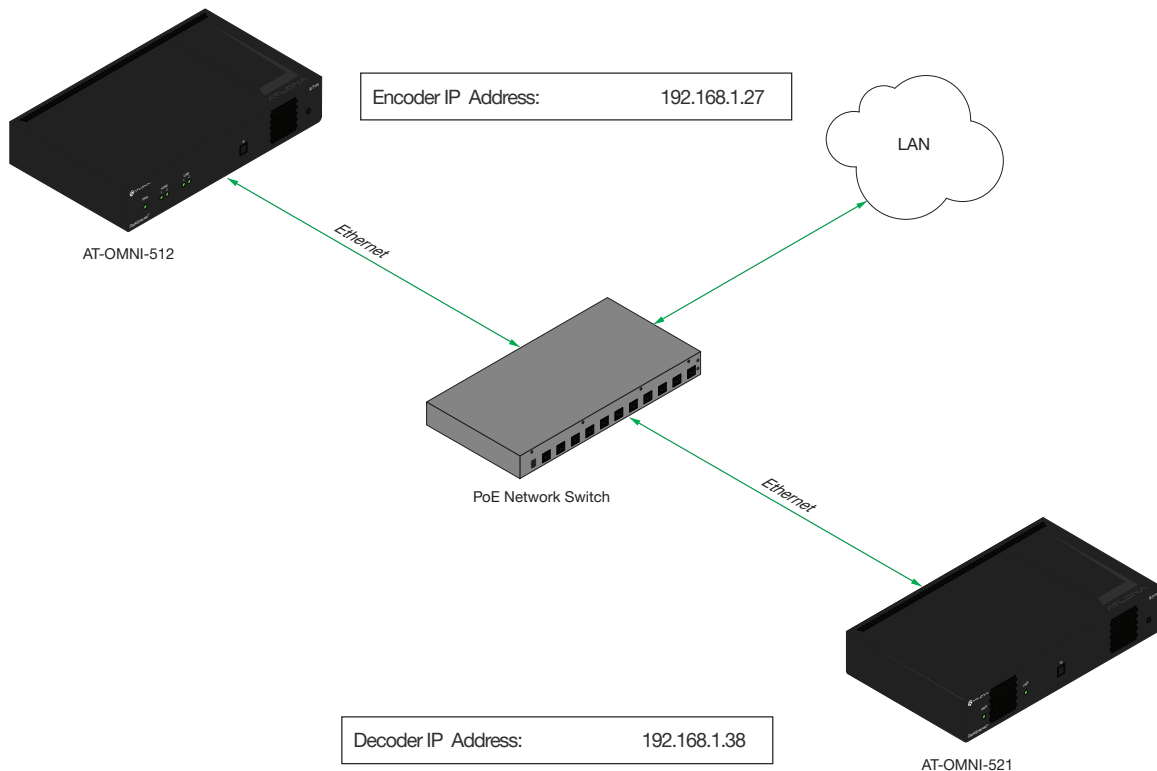>
> *Decoder* – Receives and decompresses signals from an encoder and sends them to an output device, such as a display or other sink device.
>
> *IP Address* – A unique numerical label that is assigned to each device connected to a network.

IP Address Assignment

Figure 1.1 below, shows an encoder and a decoder, connected through a network switch. As with all network devices, both the encoder and decoder must have unique IP addresses. OmniStream encoders and decoders are DHCP-enabled, by default. This means that when the encoder/decoder is connected to the network, and a DHCP server is available, the encoder/decoder will automatically be assigned an IP address. If no DHCP server is available, then the unit will use a self-assigned IP address within the range of `169.254.xxx.xxx/16`. OmniStream devices can also be assigned a static IP address, if necessary. Static IP addressing will be covered in a later section.

Figure 1.1 - An encoder and decoder on a network, with assigned IP addresses.

| Encoder IP Address: | 192.168.1.27 |

AT-OMNI-512

LAN

Ethernet

PoE Network Switch

Ethernet

| Decoder IP Address: | 192.168.1.38 |

AT-OMNI-521

Network Bandwidth and OmniStream Compression

When sending video and audio over a network, the available bandwidth needs to be managed. Gigabit Ethernet switches are very common and can take advantage of installed Category 5e cable. 10-Gigabit Ethernet switches are available, but are more expensive per port and require Category 6A cable or better. The chart below shows uncompressed data rates for common resolutions. These data rates exceed the available bandwidth of Gigabit Ethernet, but using the compression technology in OmniStream, this video can be streamed over cost-effective Gigabit networks.

Resolution	Data Rate*
1920 x 1080p 30 Hz	2.2 Gbps
1920 x 1080p 60 Hz	4.5 Gbps
3840 x 2160p 30 Hz	8.9 Gbps
3840 x 2160p 60 Hz	17.8 Gbps

* Data rate is shown without compression.

OmniStream compresses the source data at the encoder, before it is sent out over the network. This process is known as *encoding*. OmniStream uses VCx and VC-2 compression, which are intermediate compression schemes and offer lower latency and higher video fidelity than an interframe compression scheme, such as H.264 or H.265. Interframe codecs are typically used by cable or internet providers and use very aggressive bit rates (low bandwidth) with high latency (delay), which results in lag. VCx and VC-2 provide both high quality (high bit rates) and very low-latency for a much more desirable viewing experience.

Streams

The term *stream* is used throughout this manual, to describe the different types of signals that are transmitted over a network. For example, if a blu-ray player is connected to an encoder, both video and audio are sent to the encoder over an HDMI cable. The term *video stream* is used to identify the video portion of a signal and *audio stream* identifies the audio portion of the signal.

Sessions

A *session* is a way of organizing audio and video streams. The session identifies each stream with a unique *multicast IP address* and *UDP port* assignment. This provides an address to determine where the package of audio and video should be sent. <u>Table 1.1</u> illustrates how a session encapsulates a video and audio stream.

> ℹ **NOTE:** Sessions are not limited to only video and audio streams. Control data, such as IR and RS-232, as well as AES67 audio, can also be contained within a session. These topics will be covered in a later chapter.

Table 1.1 - Video and audio streams contained within a session.

Session

Video Stream	Multicast IP Address	UDP Port
Audio Stream	Multicast IP Address	UDP Port

Subscribing to a Stream

To receive information from an encoder, the decoder must *subscribe* to the multicast IP address and UDP port of the stream(s). Note that the decoder does not subscribe to the session, but to the stream(s) within the session. The process of subscribing is similar to changing the channel on a Set-Top Box. For example, in order to view the content on channel 213, the Set-Top Box must be set to channel 213. Similarly, for a decoder to subscribe to an encoder stream, *the multicast IP address and UDP port settings on the decoder must be set to the same values as the encoder to which it is subscribed.* Note that the management IP address of a unit is different than its multicast IP address.

Figure 1.2 - Diagram of a video and audio stream, transmitted over an Ethernet cable, to the subscribing decoder.
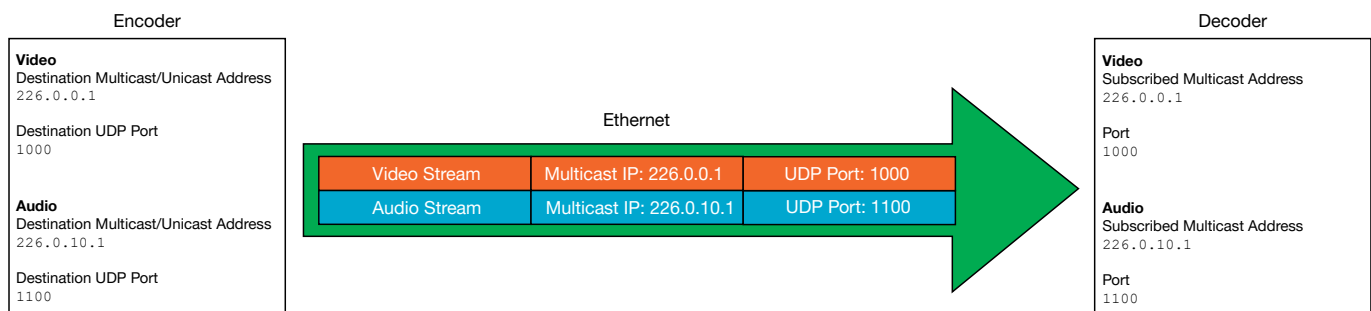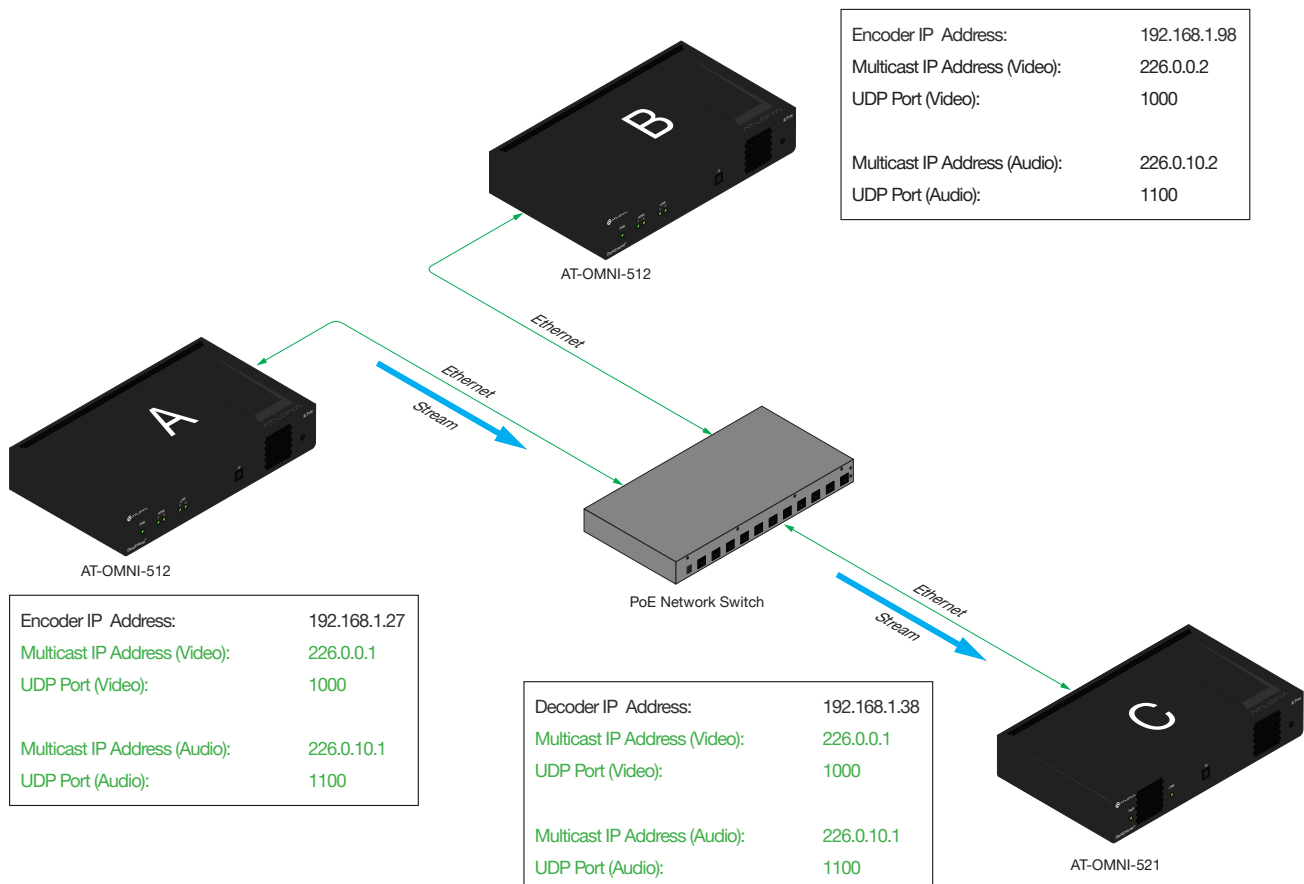

Figure 1.3 shows two encoders and a single decoder connected to a network switch. Decoder "C" is subscribed to encoder "A", since the multicast IP addresses and UDP port numbers for both video and audio are set to the same values as encoder "A".

Figure 1.3 - Decoder "C" subscribed to encoder "A".

> 📖 **DEFINITIONS**
>
> *Stream* – Describes the video, audio, or any data that is transmitted from an encoder over the network.
>
> *Multicast IP Address* – A class-D IP address assigned to a stream.
>
> *UDP Port – User Datagram Protocol (UDP) port. Part of the network addressing scheme to send and receive data to the proper destination on a network.*
>
> *Subscribing – The process of selecting the multicast IP address to "listen to", in order to receive one or more encoder streams at the decoder endpoint.*

OmniStream Naming Schema

Each OmniStream model has a different set of inputs and outputs and, depending upon the number of inputs and outputs. The number of supported session will depend upon the encoder model.
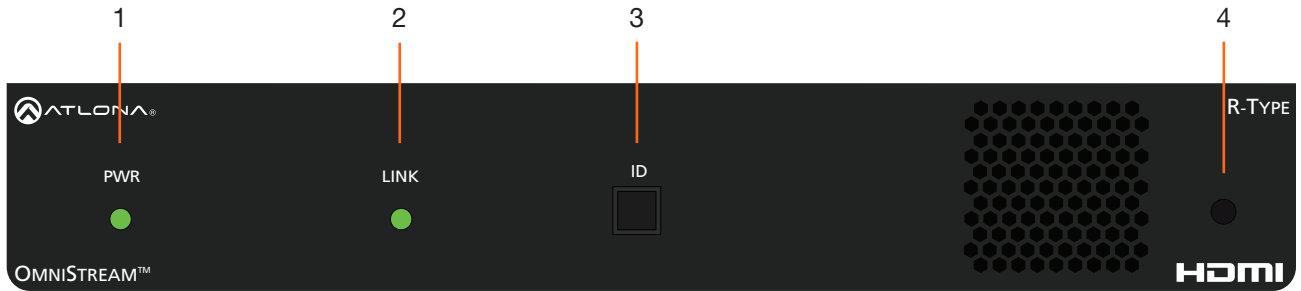
Encoders	Description
AT-OMNI-111 AT-OMNI-111-WP	• One HDMI input • One Ethernet output • Supports up to six sessions
AT-OMNI-112	• Two HDMI inputs • Two Ethernet outputs • Supports up to six sessions
AT-OMNI-512	• One HDMI input • One Ethernet output • Supports up to four sessions

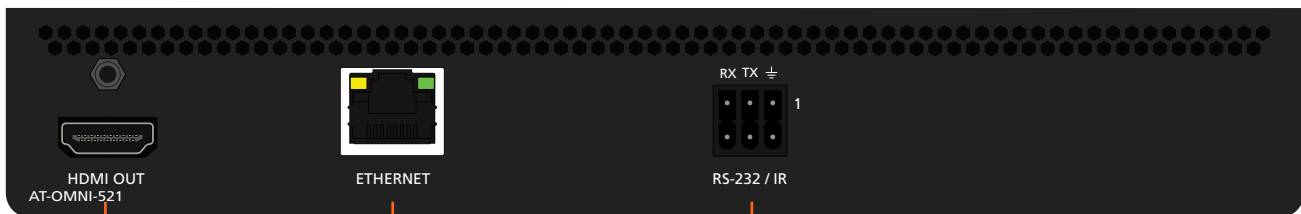| Decoders	Description
AT-OMNI-121	• One HDMI output • One Ethernet output
AT-OMNI-122	• Two HDMI inputs • Two Ethernet outputs

The last three numbers of the OmniStream SKU, describe the model version, model type, and number of outputs. Note that the number of Ethernet outputs is the same as the number of HDMI inputs.

- AT-OMNI-**112**   **1**= OmniStream Pro ("R-Type" models begin with the number "5").
  1 = Indicates that the device is an *encoder* (*decoders* are identified with the number "2").
  2 = The number of Ethernet outputs.

Panel Description

1 2 3 4

Front

Rear

6 7 8

1 PWR
This LED indicator is green when the unit is powered and booted.

2 LINK
This LED indicator is green when the link integrity between the decoder and the network switch is good.

3 ID
Press this button to send a broadcast message to any network devices that are listening. This button is also used to set the decoder to factory-default settings. Refer to ID Button (page 17) for more information.

> **i** **NOTE:** Some older hardware revisions do not have an **ID** button.

4 Reboot button
Press this button, using a small, pointed object to reboot the unit.

5 HDMI OUT
Connect an HDMI cable from this port to a UHD/HD display.

6 ETHERNET
Connect an Ethernet cable from this port to the Local Area Network (LAN).

7 RS-232 / IR
Connect the included 6-pin push spring block to connect an automation system and an IR emitter or extender. Refer to RS-232 Connections (page 13) for more information.

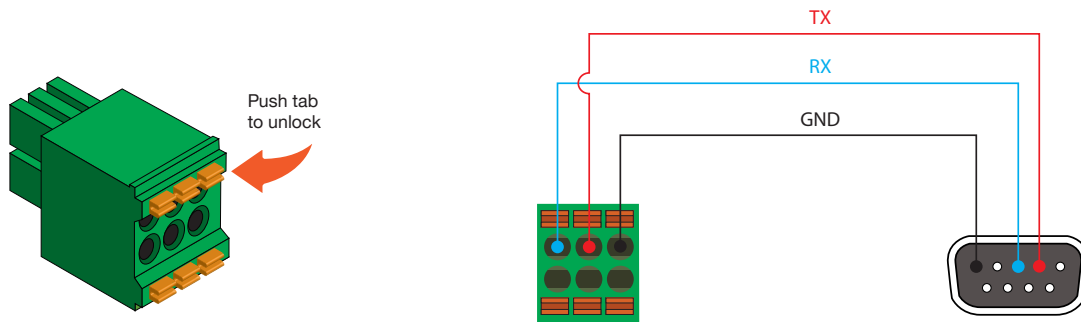## RS-232 Connections

The AT-OMNI-521 provides RS-232 over IP which allows communication between an automation system and an RS-232 device. This step is optional. Either the top three or bottom three set of terminals can be used for RS-232.
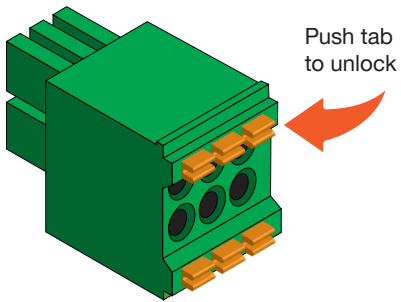
1. Use wire strippers to remove a portion of the cable jacket.

2. Remove at least 3/16" (5 mm) from the insulation of the RX, TX, and GND wires.

3. Insert the TX, RX, and GND wires into correct terminal on the included push-spring block. If using non-tinned stranded wire, press the orange tab, above the terminal, while inserting the exposed wire.   Repeat this step for the TX, RX, and GND connections.
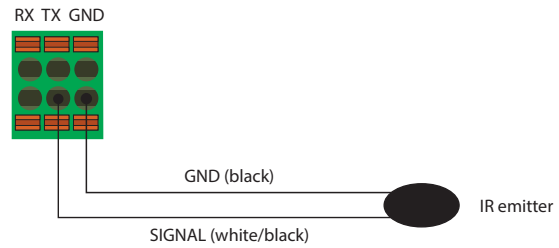

NOTE: Typical DB9 connectors use pin 2 for TX, pin 3 for RX, and pin 5 for ground. On some devices, pins 2 and 3 are reversed.
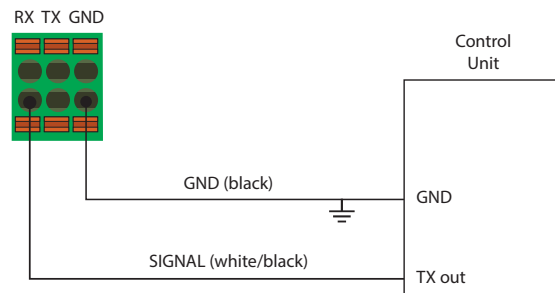
IR Connections

The same port that provides RS-232 connections also supports bidirectional IR pass-through, allowing a device to be controlled from either the headend or the decoder endpoint. This step is optional. Refer to Device Control (page 35) for more information.

Push tab
to unlock

IR emitter configuration

RX TX GND

GND (black)

SIGNAL (white/black)

IR emitter

IR extender configuration

RX TX GND

Control
Unit

GND (black)

GND

SIGNAL (white/black)
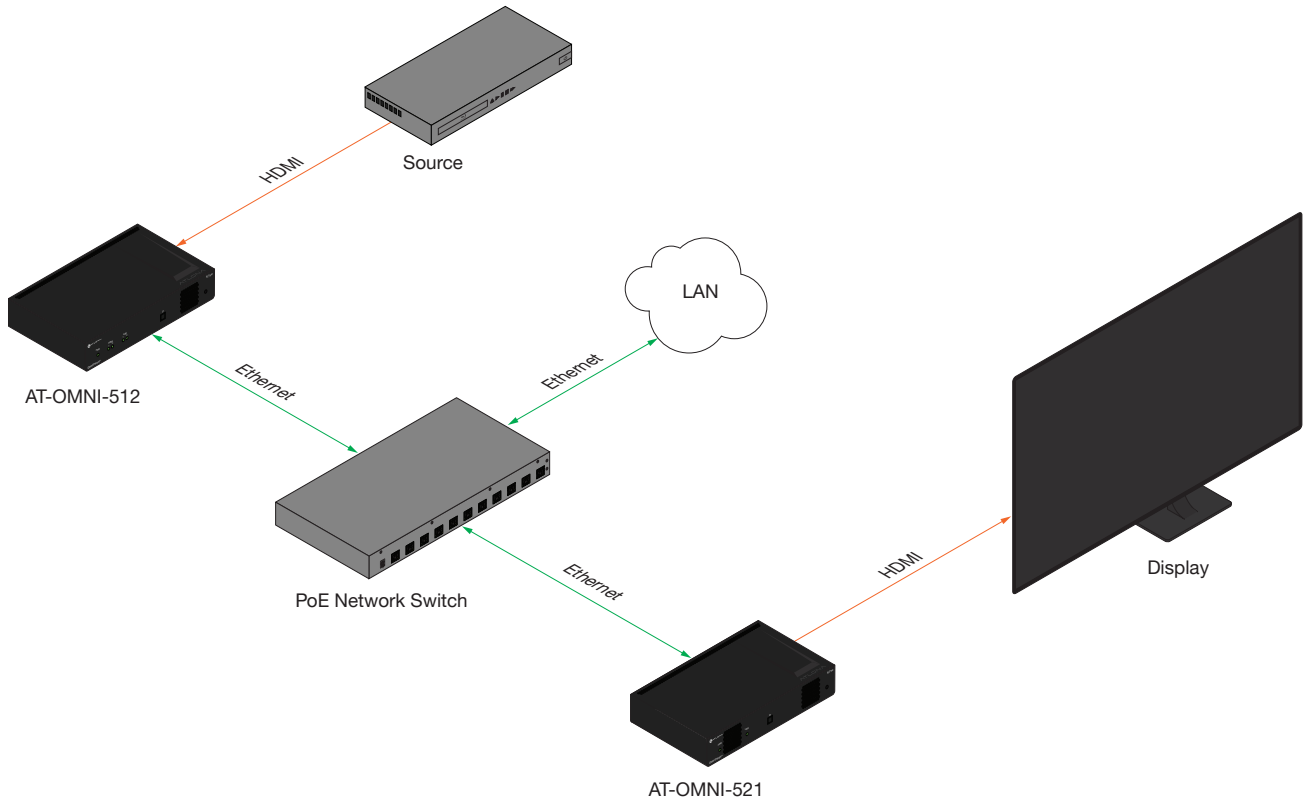
TX out

Connection Instructions

1. Connect an Ethernet cable from the **ETHERNET** port on the decoder to a PoE-capable switch on the Local Area Network (LAN).

> ⚠️ **IMPORTANT:** If a PoE-capable switch is not available, a PoE injector (purchased separately) must be used.

2. Connect an HDMI cable from the **HDMI OUT** port to a UHD/HD display.

3. RS-232 (optional)

   • Connect the RS-232 controller/automation system to the **RS-232** port on the decoder.

   • Connect the RS-232 device to the **RS-232** port on the decoder.

4. IR (optional)

   • **IR emitter**
     Connect the IR emitter to the **TX** and **GND** pins of the **RS-232 2** port. The IR emitter must be placed no more than one inch from the IR sensor on the device, in order to function properly.

   • **IR extender**
     Connect the IR extender from the **RX** and **GND** pins of the **RS-232 2** port to the associated pins on the control system.

5. Once the unit is powered, the **PWR** indicator, on the front panel, will turn red, then amber, then green.

Connection Diagram

HDMI
Source

LAN

Ethernet

Ethernet

AT-OMNI-512

Ethernet

PoE Network Switch

HDMI
Display

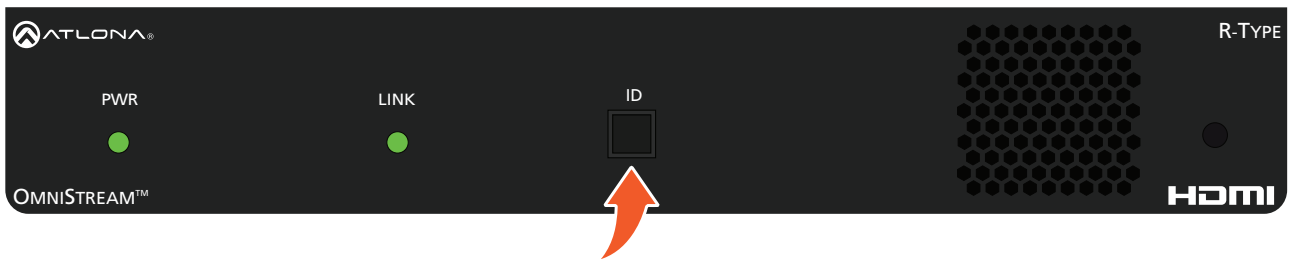AT-OMNI-521

Getting Started

ID Button

The **ID** button serves two functions:

1. Sends a broadcast message, over the network, to any devices that may be listening.

2. Resets the decoder to factory-default settings.

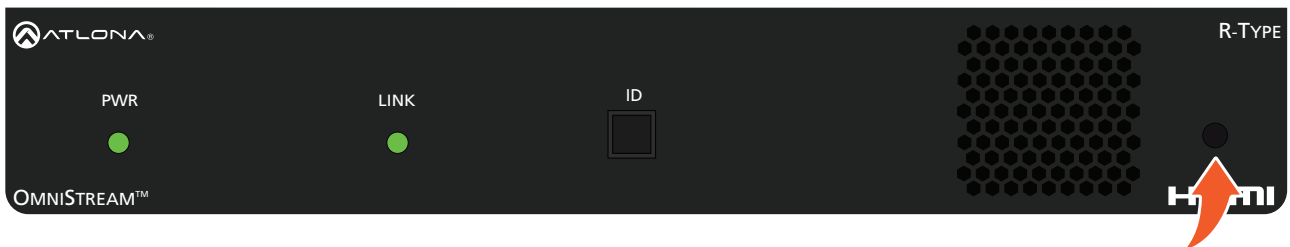> ℹ️ **NOTE:** Some older hardware revisions do not have an **ID** button.

Broadcast Messaging

Press and release the **ID** button to send a broadcast notification over the network to any devices that may be listening.

Rebooting OmniStream

To reboot the OmniStream decoder, press and release the recessed button, on the far-right side of the unit, using a small, pointed object. Rebooting the decoder does not reset the decoder to factory-default settings.

Resetting to Factory-Defaults

> ⚠️ **WARNING:** Performing a factory-default reset will erase all user-programmed settings from the encoder. IP settings are not preserved.

Using the ID button

1. Press and hold the **ID** button for approximately 30 seconds.

2. The LED indicators on the front panel will flash, then turn "off."

3. The encoder is now reset and will need to be reconfigured.

Using the Mclear command

1. Connect a PC to serial port 1 using a USB to serial cable.

2. Set the PC console port to the following settings: 9600 baud, 8 data bits, 1 stop bit, no parity.

3. Once connected to the CLI, execute the `Mclear` command.

Using the Web Server

1. Log in to the decoder using the built-in web server. Refer to for more information.

2. Click the **FACTORY RESET** button.

3. The decoder is now reset and will need to be reconfigured.

LED Indicators

The following table provides a listing of front-panel LED indicators and their status:

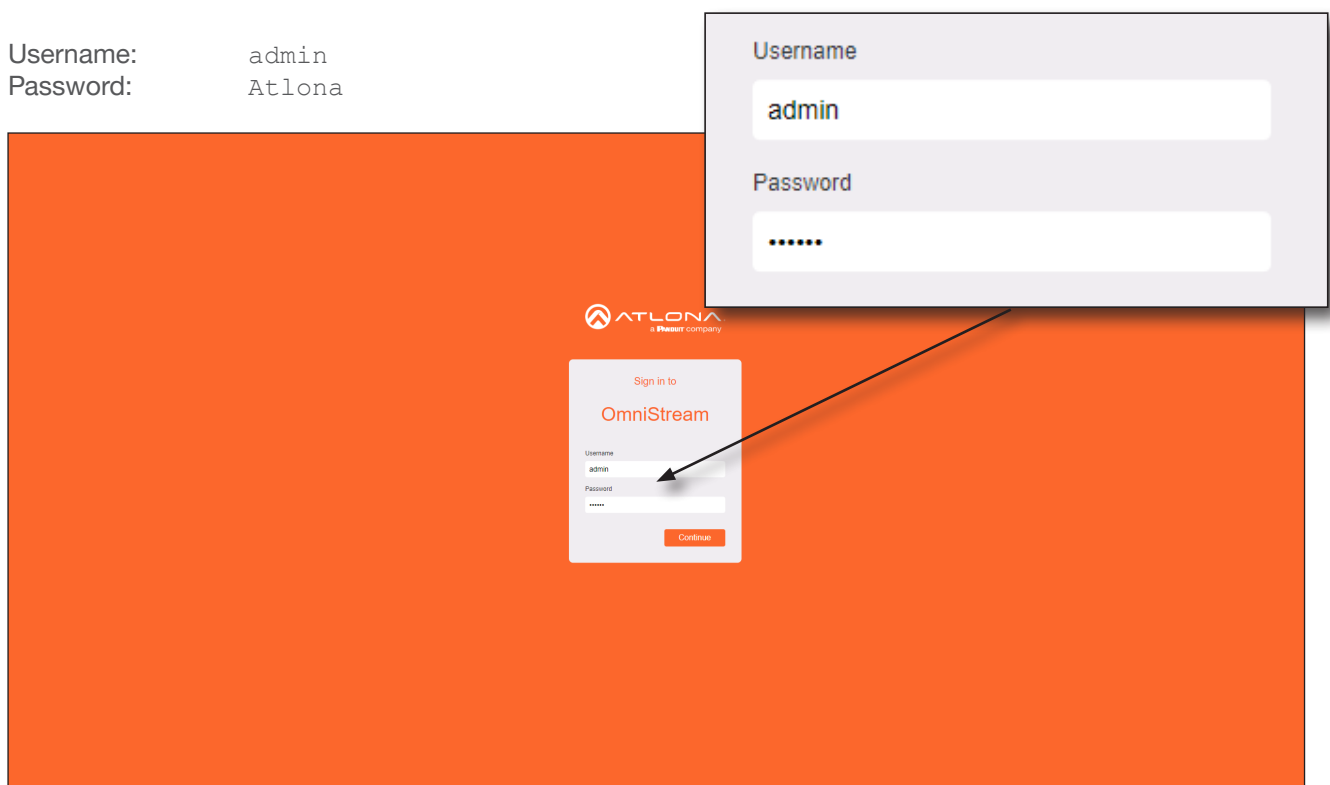| LED			Description
PWR	Off	○	• If using a PoE switch, make sure that the port on the switch that is connected to the decoder, has PoE enabled. When the decoder is powered using PoE, the **PWR** indicator will be green. • Check the Ethernet cable for possible damage or loose connections. • Connect the optional 48V DC power supply (available from atlona. com) to the encoder. When using an external power supply, the **PWR** indicator will be green.
	Red	●	• The decoder is booting.
	Amber	●	• The decoder is booting and/or attempting to locate a DHCP server.
	Green	●	• The decoder is ready.
LINK 1 / 2	Red	●	• The optional 48V DC power supply is connected, but no Ethernet cables are connected between the switch and the **ETHERNET** port(s). • Check the Ethernet cable for possible damage or loose connections.
	Amber	●	• The decoder is booting.
	Green	●	• Link integrity is good between the decoder and the network.

Accessing the Web Server

In order to access the web server of the desired encoder/decoder, the IP address of the encoder must be known. This can be accomplished by using any of the following methods: 1) Running IP scanner software or 2) accessing the encoder using the domain name. When running an IP scanner, both the computer and the OmniStream encoders/decoders must be connected to the same network.

> **TIP:** Atlona recommends downloading and using the Network Assignment Planner, when setting up OmniStream products on the network. Recording this information in this document will provide a "snapshot" of the current OmniStream network configuration. The Network Assignment Planner is available for download on the OmniStream product pages, under the Resources tab.

1. Launch the desired web browser and enter the IP address or domain name of the encoder in the address bar.

2. Enter the username and password. Note that the password field will always be masked. The default credentials are:

    Username: `admin`
    Password: `Atlona`

3. The **System Information** page will be displayed.

Basic Configuration Tutorial

This section provides a tutorial on configuring two AT-OMNI-512 dual-channel encoders and one AT-OMNI-521 single-channel decoder. Make sure the encoders are connected to a source device and that the decoder is connected to a display. Both encoders and the decoder should be connected to the same local network. Refer to Connection Instructions (page 15) for more information.
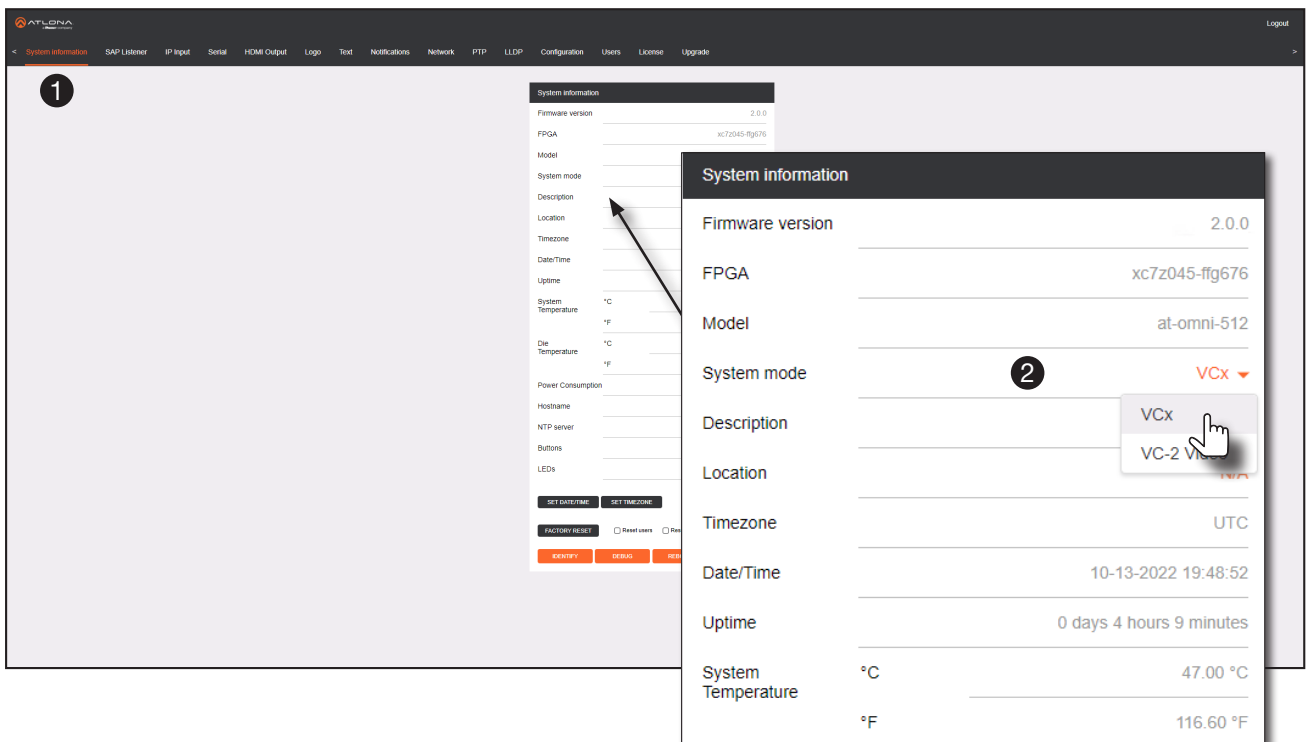
Physical Connections

Gaming Console

Encoder #2

HDMI IN

AT-OMNI-512

Laptop

Encoder #1

HDMI IN

AT-OMNI-512

LAN

Ethernet

Ethernet

Ethernet

PoE Network Switch

Decoder #1

Ethernet

AT-OMNI-521

HDMI OUT

Display

Setting the System Mode

OmniStream offers three system modes. These modes will optimize the video, based on the type of information that is being displayed and/or the desired features.

1. Login to the encoder and click **System Information** in the menu bar.

2. Click the **System mode** drop-down list and select `VCx`. This mode will provide access to all of OmniStream 2.0 features.

Mode	Description
`VCx`	This is the default mode and represents the latest codec technology from Atlona, with outstanding support for computer graphics and motion video. VCx includes support for 4K60 4:4:4 fast switching, dual streaming from AT-OMNI-111 encoders, and multiview on the decoders.
`VC-2 Video`	Legacy OmniStream codec that provides the best viewing experience when streaming motion graphics and/or video.

Click **SAVE** at the bottom of the page to commit changes.

Login to the decoder interface and repeat this process.

Configuring Inputs

The **Input** page is used to verify that the encoder recognizes the source device. This page is also used to set the EDID, HDCP version, and provides detailed information about the source signal. _The following procedure should be performed on both AT-OMNI-512 encoders._

1. Click **Input** in the menu bar.

2. Since a source has been connected to the **HDMI IN** port, the **Cable present** indicator within the **Input 1** window group is green, as shown below. This indicates that an active source is connected to the HDMI port.

   If these indicators are red, check that each source is connected to an **HDMI IN** port. A red indicator may also describe faulty HDMI cables. If the sources are connected, then try different HDMI cables. If the HDMI cable integrity has been verified, then make sure that the output resolution of the source is at least 720p.

   > **TIP:** If no signal is being received on the encoder, then it's always a good practice to check the **Input** screen on the encoder when performing additional troubleshooting.

3. Click the **EDID** drop-down list to select an EDID. For now, leave this setting at `Default HDR MCH`. This EDID provides general compatibility with most displays.

4. The **HDCP** > **Encrypted** indicator will be green if HDCP content is present. In this example, the source connected to **HDMI IN 1** is not transmitting HDCP content. Therefore, the indicator is red.

5. Click the **HDCP** > **Version** drop-down list to restrict HDCP to a particular version. By default, this is set to `2.2` and this setting should be used for most applications.

6. The **Video** section provides information about the input signal: color depth, subsampling, color space, resolution, frame rate, and HDR (High Dynamic Range). If the HDR indicator is green, this will indicate that HDR content is being transmitted from the source device.

7. The **Audio** section displays audio information (if present) from the source device: bit depth, the number of audio channels, the audio format, and the frequency.
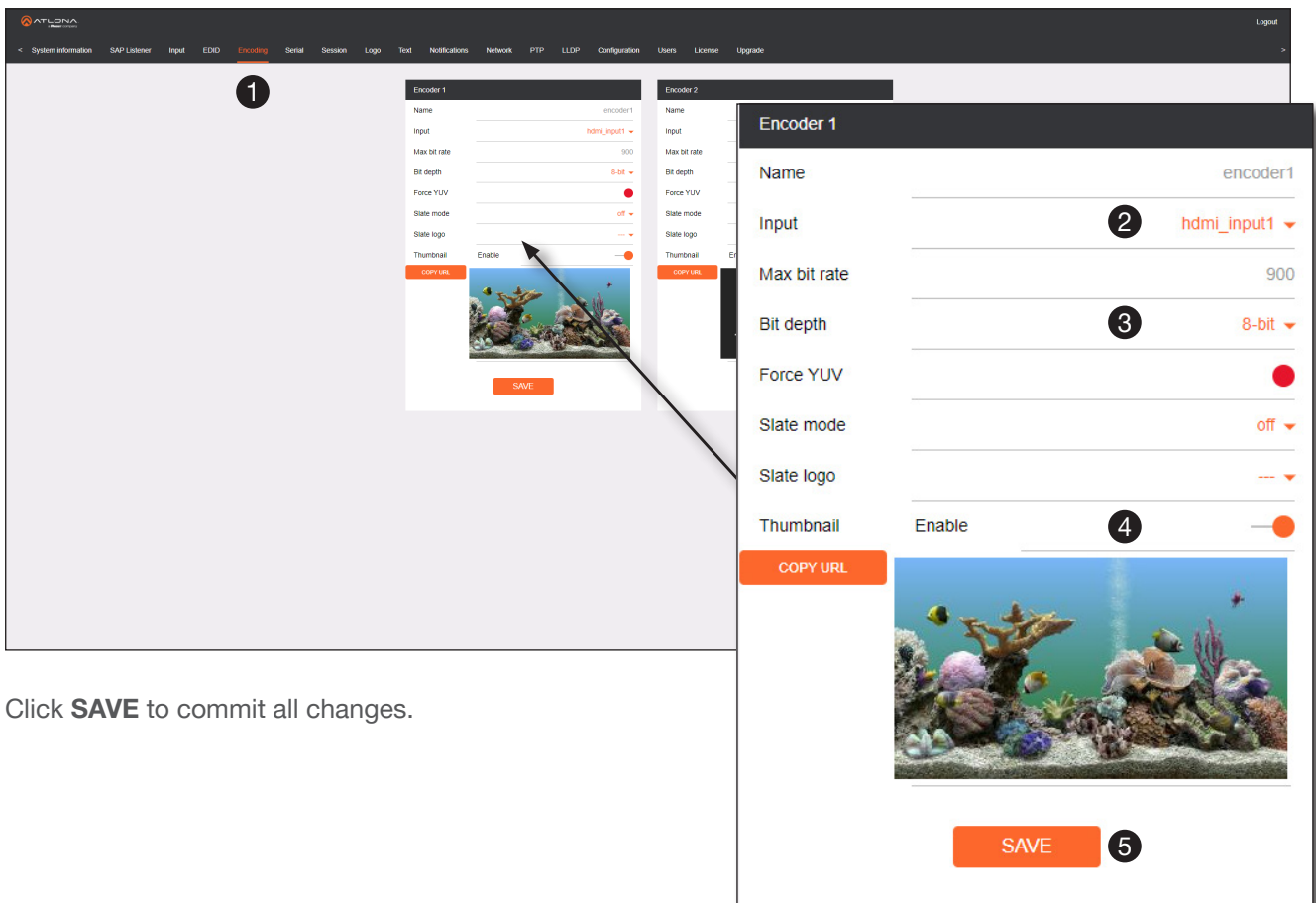
8. Click **SAVE** to commit all changes.

Input 1		
Name		hdmi_input1
Cable present		🟢
EDID		Default HDR MCH ▾
HDCP	Encrypted	🔴
	Version	2.2 ▾
	Negotiated version	none
Video ❻	Color depth	8
	Subsampling	444
	Colorspace	RGB
	Resolution	1600 x 900p
	Framerate	60.00
	HDR	🔴
Audio ❼	Bit depth	16
	Channel count	2
	Format	LPCM
	Frequency	48kHz

❽ SAVE

Encoder Settings

The **Encoding** page is used to assign an input to an encoder. In addition, this page allows video settings, such as bit depth, and slate/logo settings. Video thumbnails of the source device can also be displayed on this page. *The following procedure should be performed on both AT-OMNI-512 encoders.*

1. Click **Encoding** in the menu bar.

2. Under the **Encoder 1** window group, click the **Input** drop-down list and select `hdmi_input1`.

3. Click the **Bit depth** drop-down list to change the bit depth. In this example, it will be set to `8-bit`.

4. Click the **Thumbnail** > **Enable** toggle switch to enable it and display a thumbnail of the source. When enabled, the toggle switch is orange and a thumbnail of the source will be displayed. If no thumbnail is displayed when this feature is enabled, verify that the source is connected, powered, and is configured correctly under the **Input** menu.

5. Click **SAVE** to commit all changes.

Creating a Session

Before the video and audio (if any) can be sent out over the network, a session must be created on the encoder. The session assigns each stream to a unique multicast IP address and UDP port assignment. Sessions are always created on encoders. *The following procedure should be performed on both AT-OMNI-512 encoders, except where noted*.

1. Click **Session** in the menu bar.

2. Under **Session 1**, the **Name** field indicates the session name. This value is set to `session1` and cannot be changed.

3. The **Scrambling** > **Enable** toggle switch is enabled by default. When enabled, this toggle will be orange. Leave this setting enabled.

4. The **Scrambling** > **Key** field is set to `scrambling` by default. Scrambling keys can be any combination of alphanumeric characters and it is good practice to use them. For this tutorial, use the default key.

5. Click the **Video** > **Enable** toggle switch and make sure it is enabled for **Session 1**. When enabled, the toggle switch will be orange. If set to disabled, then the encoder video stream will be disabled.

6. Enter the multicast IP address for the video stream in the **Destination IP address** field. Atlona recommends using multicast IP addresses as shown in *Table 2.1*, on the next page. Enter `226.0.0.1` in the **Destination IP address** field for **Session 1** on *Encoder #1*. For *Encoder #2*, enter `226.0.0.2` in the **Destination IP address** field for **Session 1**.

7. Enter the UDP port in the **Destination UDP port** field. Although any valid UDP port can be used, Atlona suggests using the UDP port numbers in *Table 2.2*, shown on the next page. Since this is a video stream, enter `1000` in the **Destination UDP port** field for **Session 1**.

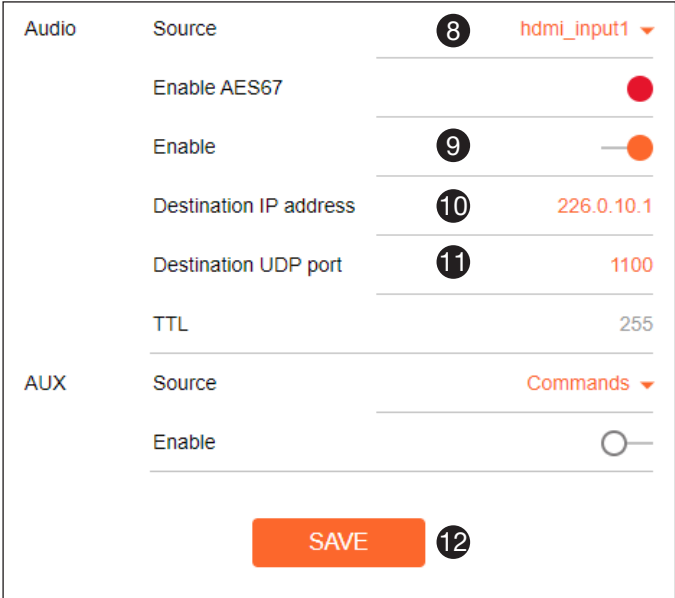*Table 2.1* - Recommended multicast IP address for video, audio, and data streams.

Stream	Video	Audio	Data (Control)
First source	226.0.0.1	226.0.10.1	226.0.20.1
Second source	226.0.0.2	226.0.10.2	226.0.20.2
nth source	226.0.0.n	226.0.10.n	226.0.20.n

Table 2.2 - Recommended UDP ports for video, audio, and data streams.

Stream	Video	Audio	Data (Control)
UDP Port	1000	1100	1200

8. Click the **Audio** > **Source** drop-down list and select the HDMI audio input for the session. The source is connected to **HDMI IN**. Therefore, set this to `hdmi_input1` for **Session 1**.

9. Click the **Audio** > **Enable** toggle switch and make sure it is enabled. When enabled, it will be orange. If disabled, no audio will be streamed from the encoder.

10. Enter the multicast IP address for the audio stream in the **Destination IP address** field. Refer to *Table 2.1*, above. In this example, enter `226.0.10.1` for **Session 1** on *Encoder #1* and `226.0.10.2` for **Session 1** on *Encoder #2*.

11. Enter the audio stream UDP port in the **Destination UDP port** field for **Session 1**. Refer to *Table 2.2*, above. Since this is an audio stream, use UDP port `1100`.

12. Click the **SAVE** button to commit all changes to **Session 1**.

Subscribing to an Encoder

The next step is to configure the decoder so that it is able to receive video, audio, and/or data (control) streams from the encoder. This process is referred to as "subscribing to the encoder".

Video Configuration

1. Go to the decoder and click **IP Input** in the menu bar.

2. Locate the **Input 1** window group and verify that the **Enable** toggle switch is enabled. When enabled, the toggle switch will be orange. Perform the same procedure for the **Input 2** window group.

3. Under the **Input 1** window group, enter `226.0.0.1` in the **Multicast address** field. Under the **Input 2** window group, enter `226.0.0.2` in this field. These multicast IP address are the same addresses that were specified under the **Video** > **Destination IP address** field for the encoders.

4. In the **Port** field, enter `1000` under both **Input 1** and **Input 2** window groups. These are the same port settings that were entered under the **Video** > **UDP Port** section of the encoder.

5. Click the **SAVE** button, under the **Input 1** and **Input 2** window groups, to commit changes.

Audio Configuration

1. Locate the **Input 3** window group and verify that the **Enable** toggle switch is enabled. When enabled, the toggle switch will be orange. Perform the same procedure for the **Input 4** window group.

2. Under the **Input 3** window group, enter `226.0.10.1` in the **Multicast address** field. Under the **Input 4** window group, enter `226.0.10.2` in this field. These multicast IP address are the same addresses that were specified under the **Audio** > **Destination IP address** field for the encoders.

3. In the **Port** field, enter `1100` under both **Input 3** and **Input 4** window groups. These are the same port settings that were entered under the **Audio** > **UDP Port** section of the encoder.

4. Click the **SAVE** button, under the **Input 3** and **Input 4** window groups to commit changes.

Input Configuration Notes

Although there is no hard and fast rule for which **Input** window groups should be used for video, audio, and/or control, it can be helpful to visualize the **Input** window groups as columns and rows to better organize the IP data. Here, each column of **Input** window groups represents an encoder.

Table 2.3 - Video and Audio information for each encoder.

Encoder #1

Input	Multicast Address
Input 1	Video (226.0.0.1:1000)
Input 3	Audio (226.0.10.1:1100)

Encoder #2

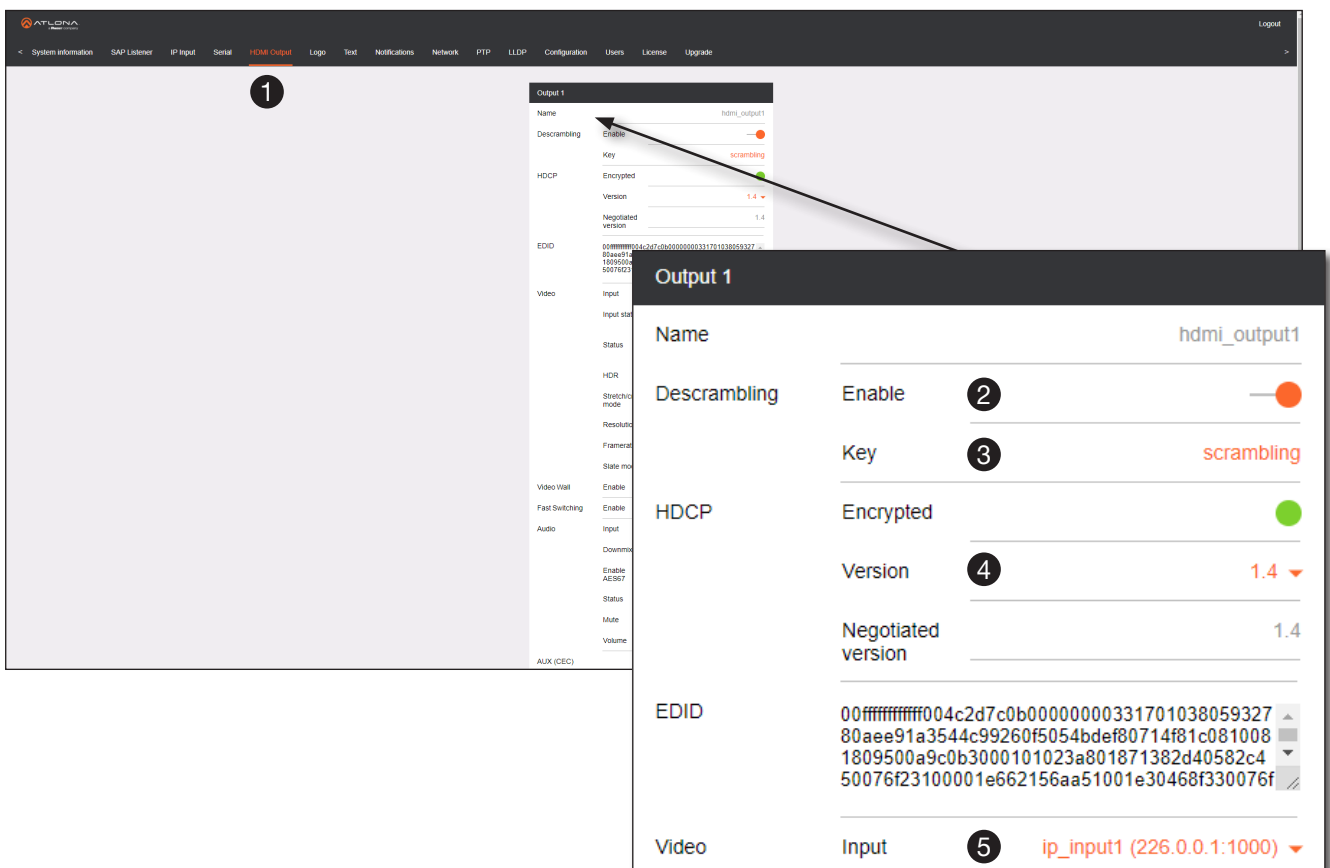| Input	Multicast Address
Input 2	Video (226.0.0.2:1000)
Input 4	Audio (226.0.10.2:1100)

Configuring the HDMI Output Stream

1. Click **HDMI Output** in the menu bar.

2. The **Descrambling** > **Enable** toggle switch is enabled by default. When enabled, this toggle will be orange. For this example, leave the setting enabled.

3. The **Descrambling** > **Key** field is set to `scrambling` by default. This is the same key that is being used under the **Scrambling** > **Key** field on the encoder, and will allow the decoder to descramble the signal and send it out over the HDMI output to the display. Leave this key at it's default setting.

4. Click the **HDCP** > **Version** drop-down list and select the HDCP version. `2.2` will work with most sources. However, in this case, an older sink/monitor which doesn't support HDCP 2.2 is being used. Therefore, the value is set to `1.4`.

5. Click the **Video** > **Input** drop-down list and select the video source. Based on what has been configured, the following options are available:

Video > Input
ip_input1 (226.0.0.1:1000)
ip_input2 (226.0.0.2:1000)
ip_input3 (226.0.10.1:1100)
ip_input4 (226.0.10.2:1100)

Since this is the **Video** field, a video source should be selected. Referring to _Table 2.3_, on the previous page, `ip_input1 (226.0.0.1:1000)` and `ip_input2 (226.0.0.2:1000)` are video data, from two different encoders. For this example, this field will be set to `ip_input1 (226.0.0.1:1000)`.

6. Scroll down to the **Audio** > **Input** field and select the desired audio stream. Referring to _Table 2.3_ (shown below), the audio stream that is associated with encoder 1 is **Input 3**. Therefore, `ip_input3 (226.0.10.1:1100)` is selected.

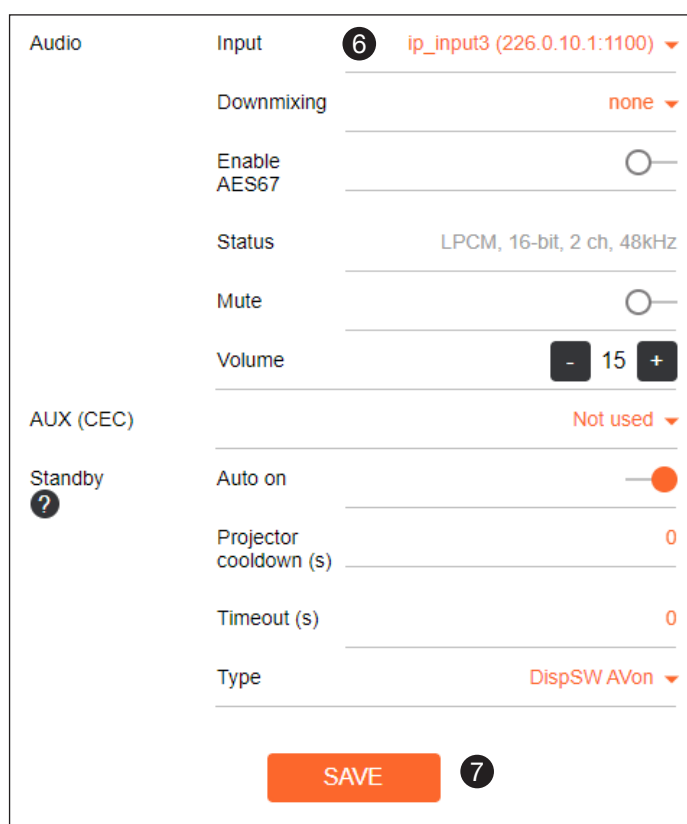_Table 2.3_ - Video and Audio information for each encoder.

Encoder #1

Input	Multicast Address / Port
Input 1	Video `(226.0.0.1:1000)`
Input 3	Audio `(226.0.10.1:1100)`

Encoder #2

Input	Multicast Address / Port
Input 2	Video `(226.0.0.2:1000)`
Input 4	Audio `(226.0.10.2:1100)`

7. Click the **SAVE** button to commit changes.

The decoder should now display the content of the source device connected to **HDMI IN** on the encoder. _Figure 3.1_, on the next page, shows the completed configuration.

To switch between video sources, click the **Video** > **Input** drop-down list and select the desired stream. To switch between audio streams, click the **Audio** > **Input** drop-down list to select the desired stream.

Note that separating video and audio data into different streams, allows the flexibility of combining different video and audio sources together.

Figure 3.1 - Basic OmniStream setup with Decoder #1 subscribed to Encoder #1.

Encoder #2

Session 1

Destination IP Address (Video):	226.0.0.2
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.2
UDP Port (Audio):	1100

Gaming Console

HDMI IN

AT-OMNI-512

LAN

Laptop

HDMI IN

AT-OMNI-512

Ethernet

Ethernet

Ethernet

Encoder #1

Session 1

Destination IP Address (Video):	226.0.0.1
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.1
UDP Port (Audio):	1100

PoE Network Switch

Ethernet

AT-OMNI-521

Display

HDMI OUT

Decoder #1

HDMI Output

Destination IP Address (Video):	226.0.0.1
UDP Port (Video):	1000
Destination IP Address (Audio):	226.0.10.1
UDP Port (Audio):	1100

Basic Configuration Tutorial

Troubleshooting

If no video and/or audio is present on the display, check the following for both *Encoder #1* **and** *Encoder #2*, **unless otherwise noted**.

Encoder Checklist

- Verify that all encoders and decoders are set to the same system mode. In this tutorial, both encoders and the decoder should be set to `VCx`. Refer to Setting the System Mode (page 22).

- Go to the **Input** menu and make sure that the **Cable present** indicator, under the **Input 1** window group, is green. Refer to Configuring Inputs (page 23) for more information.

- Go to the **Encoding** menu and verify the following under the **Encoder 1** window group. Refer to Encoder Settings (page 25) for more information.
  - » Make sure the **Input** drop-down list is assigned to an input. In this tutorial, the **Input** field, under the **Encoder 1** window group, is set to `hdmi_input1`.
  - » Verify that a **Thumbnail** > **Enable** toggle switch is enabled and a thumbnail of the source is displayed.

- Go to the **Session** menu and verify the following under the **Session** window groups. Refer to Creating a Session (page 26) for more information.
  - » Check that the **Scrambling** > **Enable** toggle switch is enabled. Also check that the **Scrambling** > **Key** field, for this example, is set to `scrambling`.
  - » Verify that the **Video** > **Enable** toggle switch is set to enabled.
  - » Check the **Video** > **Destination IP address** field is set to the correct multicast IP address. In the example, `226.0.0.1`. is used on *Encoder #1* and `226.0.0.2` is used on *Encoder #2*.
  - » Check that the **Video** > **Destination UDP port** field is set to `1000`.
  - » Make sure the **Audio** > **Source** is set to `hdmi_input1`.
  - » Verify that the **Audio** > **Enable** toggle switch is enabled.
  - » Check the **Audio** > **Destination IP address** field is set to the correct multicast IP address. In this example, `226.0.10.1` is used on *Encoder #1* and `226.0.10.2` is used on *Encoder #2*.
  - » Check that the **Audio** > **Destination UDP port** field is set to `1100`.

Decoder Checklist

- Verify that all encoders and decoders are set to the same system mode. In this tutorial, both encoders and the decoder should be set to `VCx`. Refer to Setting the System Mode (page 22).

- Go to the **IP Input** menu and verify the following. Refer to Subscribing to an Encoder (page 28) for more information.

  » Under both the **Input 1** and **Input 2** window groups, verify that the **Enable** toggle switch is enabled.

  » Check that the **Multicast address** field is set to the correct multicast IP address. In this example, `226.0.0.1` for **Input 1** and `226.0.0.2` for **Input 2**.

  » Check that the **Port** field is set to the proper port. In this example, `1000` for both **Input 1** and **Input 2**.

  » Under both the **Input 3** and **Input 4** windows groups, verify that the **Enable** toggle switch is enabled.

  » Check that the **Multicast address** field is set to the correct multicast IP address. In this example, `226.0.10.1` for **Input 3** and `226.0.10.2` for **Input 4**.

  » Check that the **Port** field is set to `1100` for both **Input 3** and **Input 4**.

- Go to the **HDMI Output** menu and verify the following. Refer to Subscribing to an Encoder (page 28) for more information.

  » Make sure that the **Descrambling** > **Enable** toggle switch is enabled.

  » Verify that the **Descrambling** > **Key** field is set to `scrambling`.

  » Check the **HDCP** > **Version** field to make sure the correct version is selected. Also note the color of the **HDCP** > **Encrypted** indicator. if it is red, then a picture may not be displayed and result in a "blue screen" on the display. Change the **HDCP** > **Version** field, if necessary.

> ⚠️ **IMPORTANT:** The scrambling key on a decoder must be _identical_ to the scrambling key on the encoder which is being subscribed. Scrambling keys are case-sensitive.

  » Make sure that the **Video** > **Input** drop-down list is set to one of the configured inputs: either `ip_input1` or `ip_input2`.

  » Make sure that the **Audio** > **Input** drop-down list is set to one of the configured inputs: either `ip_input3` or `ip_input4`.

Device Operation

Device Control

Downstream Control using RS-232

Control using RS-232 is converted and transmitted over IP by the encoder. Destination devices can either be the IP address of a display or a decoder.

1. Login to the encoder and click the **Serial** menu.

2. Under the **Serial Port Configuration** window group, click the **Mode** drop-down list and select `Serial`.
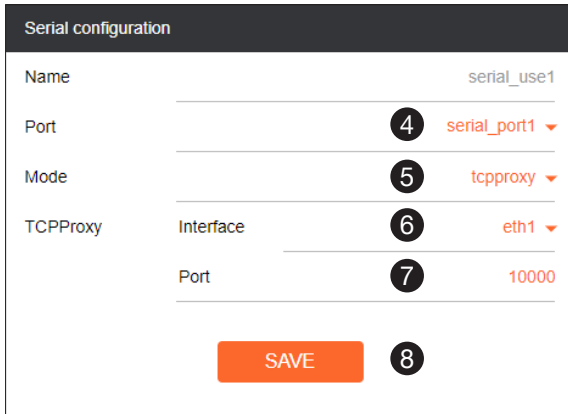
3. Click the **SAVE** button.

4. Under the **Serial configuration** window group, click the **Port** drop-down list and select `Not Used`.

5. Click the **SAVE** button.

6. Click the **Session** menu.

7. Under the desired Session, locate the **AUX** section and click the **Source** drop-down list to select the desired serial port.

8. Click the **Enable** toggle switch to display the additional fields.

9. Enter the destination IP address and UDP port in the **Destination IP address** and **Destination UDP port** fields, respectively.

10. Click the **SAVE** button.

If the destination IP address and UDP port is for a <u>decoder</u>, follow Steps 11 through 20, beginning on the next page:

11. Login to the decoder and click the **IP Input** menu.

12. Locate an Input that does _not_ contain a defined Multicast address field. In this example, **Input 5** will be used. Note that if a multicast address was used in Step 9, then that multicast address must be entered in the **Multicast address** field under **Input 5**.

13. Click the **Enable** toggle switch to enable the Input. When an Input is enabled, the toggle switch will be orange.

14. Enter the UDP port, from Step 9, in the **Port** field.

15. Click the **SAVE** button.

16. On the decoder, click the **Serial** menu, and under **Serial port configuration**, click the **Mode** drop-down list and select `serial`.

17. Click the **SAVE** button.

18. Under the **Serial configuration** window group, click the **Port** drop-down list and select the desired port.

19. Click the **Mode** drop-down list and select `output`.

20. Click **SAVE**.

Control using TCP Proxy

TCP/IP traffic received by an encoder or decoder, on the defined IP:Port socket, are translated to RS-232, allowing both control of source or display. Control is achieved using a control system, where all control commands are stored.

1. Login to the encoder or decoder and click the **Serial** menu.

2. Under the **Serial Port Configuration** window group, for the desired serial port, click the **Mode** drop-down list and select `Serial`.
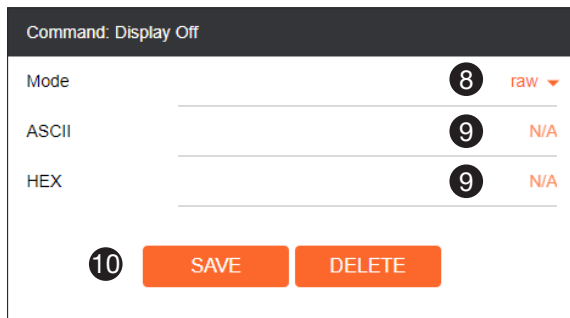
3. Click the **SAVE** button.

4. Under the **Serial Configuration** window group, click the **Port** drop-down list and select the desired serial port.

5. Click the **Mode** drop-down list and select `tcpproxy`.

6. Click the **TCPProxy** > **Interface** drop-down list and select the desired Ethernet interface.

7. Enter the listening port in the **TCPProxy** > **Port** field.

8. Click the **SAVE** button.

Serial configuration			
Name			serial_use1
Port		④	serial_port1 ▾
Mode		⑤	tcpproxy ▾
TCPProxy	Interface	⑥	eth1 ▾
	Port	⑦	10000
	SAVE	⑧	

Downstream Control using Triggering

TCP/IP traffic received by an encoder or decoder, on the defined IP:Port socket, are translated to RS-232, allowing both control of source or display. Control is achieved using a control system, where all control commands are stored.

Option 1: Defining Commands on the Decoder

1. Login to the decoder and click the **Serial** menu.

2. Under the **Serial Port Configuration** window group, for the desired serial port, click the **Mode** drop-down list and select `Serial`.

3. Click the **SAVE** button.

4. Under the **Serial Configuration** window group, click the **Port** drop-down list and select the desired serial port.

5. Click the **Mode** drop-down list and select `output`.

6. Click the **Input** drop-down list and select `not used`.

7. Click the **SAVE** button.

8. For each of the available commands, click the **Mode** drop-down list and select `raw`.

   The available commands are: **Display On**, **Display Off**, **Volume Up**, and **Volume Down**.

9. Enter the command data in either ASCII or hexadecimal format using the **ASCII** or **HEX** fields.

10. Click the **SAVE** button.

11. Open a Telnet/SSH session with the decoder and trigger display control using the following command:

    `TrigRS232X Y`

    where `X` is the number of the serial port: `1`, `2`
    where `Y` is the command: `on`, `off`, `vol+`, or `vol-`.

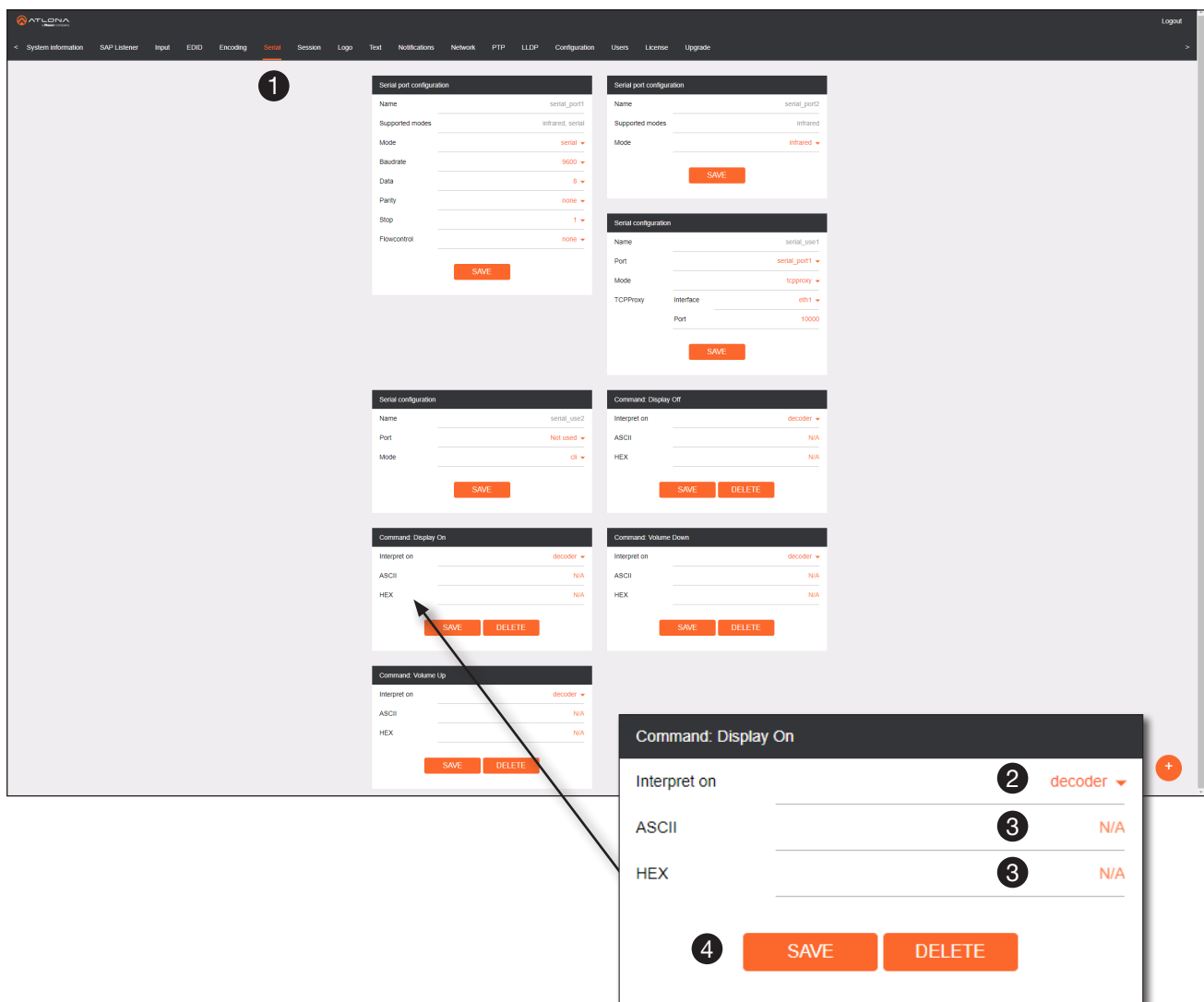## Option 2: Defining Commands on the Encoder

1. Login to the encoder and click the **Serial** menu.

2. For each of the available commands, click the **Interpret on** drop-down list and select `decoder`.

   The available commands are: **Display On**, **Display Off**, **Volume Up**, and **Volume Down**.

> **ℹ** **NOTE:** Setting the **Interpret on** drop-down list to `encoder` implies that commands are defined/stored on the encoder. If set to `decoder`, commands are defined/stored on the decoder.

3. Enter the command data in either ASCII or hexadecimal format using the **ASCII** or **HEX** fields.
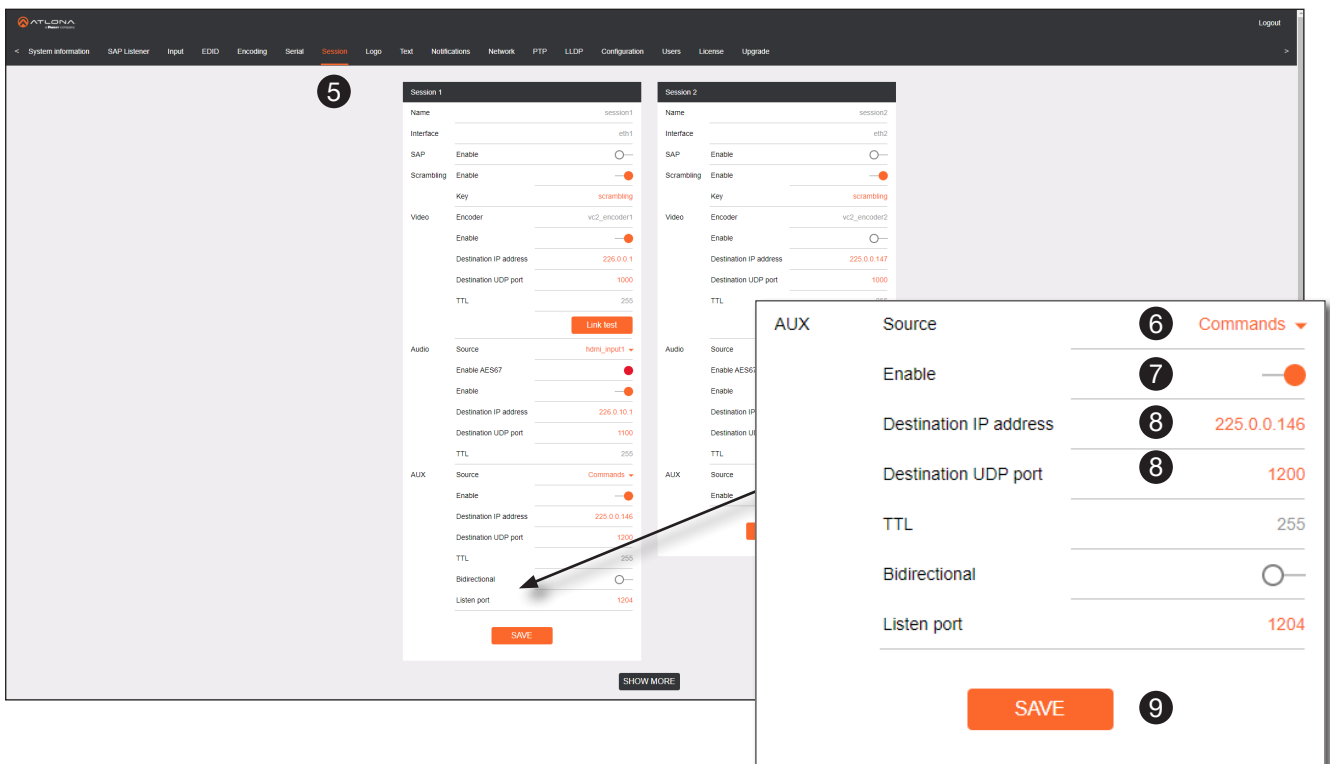
4. Click the **SAVE** button.

5. Click the **Session** menu.

6. Under the desired Session, locate the **AUX** section, click the **Source** drop-down list, and select `Commands`.

7. Click the **Enable** toggle switch to display the additional fields.

8. Enter the destination IP address and UDP port, of the decoder, in the **Destination IP address** and **Destination UDP port** fields, respectively. A multicast address can also be entered in the **Destination IP address** field.

9. Click the **SAVE** button.

10. Login to the decoder, click the **IP Input** menu, then locate an Input that does _not_ contain a defined Multicast address field. In this example, **Input 5** will be used. Note that if a multicast address was used in Step 8, then that multicast address must be entered in the **Multicast address** field under **Input 5**.

11. Click the **Enable** toggle switch to enable the Input. When an Input is enabled, the toggle switch will be orange.

12. Enter the UDP port, from Step 8, in the **Port** field.

13. Click the **SAVE** button.

14. Click the **Serial** menu.

15. Under **Serial port configuration**, set the **Mode** drop-down list to `serial`.

16. Click the **SAVE** button.

17. Under **Serial configuration**, select the desired port.

18. Click the **Mode** drop-down list and select `output`.

19. Click the **SAVE** button.

20. Open a Telnet/SSH session with the encoder and trigger display control using any of the following commands:
    `InputBtn X`

    where `X` is the number of the input: `1`, `2`, or `tog`.

    `DisplayBtnX Y`

    where `X` is the number of the HDMI input: `1`, `2`.
    where `Y` is the command: `on`, `off`, or `toggle`.

    `VolumeBtn X`

    where `X` is the volume-up or volume-down command.

Upstream Control using RS-232

The serial interface provides RS-232 control of both downstream and upstream devices. Source control is provided by enabling bidirectional communication.

1. Login to the decoder and click the **Serial** menu.

2. Under the **Serial Port Configuration** window group, click the **Mode** drop-down list and select `Serial`.

3. Click the **SAVE** button.

4. Under the **Serial configuration** window group, click the **Port** drop-down list and select the desired serial port.

5. Click the **Mode** drop-down list and select `output`.

6. Click the **Input** drop-down list and select the input.

7. Click the **Bidirectional** > **Interface** drop-down list and select the interface.

8. Enter the destination IP address (the IP address of the encoder) and UDP port in the **Bidirectional > Destination IP address** and **Bidirectional > Destination UDP port** field, respectively.

9. Click the **Bidirectional > Enabled** toggle switch to the enabled position. When enabled, the toggle switch will be orange.

10. Click the **SAVE** button.

11. Login to the encoder and click the **Serial** menu.

12. Under the **Serial Port Configuration** window group, click the **Mode** drop-down list and select `Serial`.

13. Click the **SAVE** button.

14. Under the **Serial configuration** window group, click the **Port** drop-down list and select `not used`.

15. Click the **SAVE** button.

16. Click the **Session** menu.

17. Under the desired Session, locate the **AUX** section and click the **Source** drop-down list to select the desired serial port.

18. Click the **Enable** toggle switch to display the additional fields.

19. Enter the destination IP address and UDP port in the **Destination IP address** and **Destination UDP port** fields, respectively.

20. Click the **AUX** > **Bidirectional toggle** switch to enable it. When enabled, the toggle switch will be orange.

21. Click the **SAVE** button.

Upstream Control using IR

To control of headend source from downstream, refer to the Upstream Control using RS-232 (page 45) instructions. Once configured, make sure that the serial port is configured for infrared, as shown.

⚠️ **IMPORTANT:** Depending on the hardware, IR _may_ also be supported on **RS-232** port 1. Verify the OmniStream hardware version to determine its capabilities. For decoders, IR is _only_ supported on **RS-232** port 2.

Fast Switching

The VCx codec provides fast switching at resolutions up to 4K YUV 4:4:4 @ 60 Hz. This is an improvement over the VC-2 codecs that limited fast switching up to 1920x1200. When the decoder resolution and frame rate are set to `Auto`, VCx fast switching operates at the preferred resolution and frame rate of the display. In some cases, this preferred resolution and frame rate might not be the maximum supported by the display. If fast-switching is desired at a supported resolution and/or frame rate other than the preferred resolution and frame rate, the decoder can be manually configured for those resolutions.

The fast switching time depends primarily on three things, when switching between streams: resolution, frame rate, and bitrate. For example, a 4K60 stream operating at 750 Mb/s requires ~250 ms to switch. On the other hand, a 1080p stream operating at 750 Mb/s requires less than 50 ms to switch. The time it takes to switch is determined by the amount of time it takes for all the data for a complete frame to be received by the decoder. To improve the fast switching time, decrease the resolution, lower the frame rate, or increase the bitrate.

> ⚠️ **IMPORTANT:** If Fast Switching is enabled, latency increases from 0.5 frames to 1.5 frames.

1. Login to the decoder and click **HDMI Output** in the menu.

2. Locate the **Fast Switching** section and click the **Enable** toggle switch to enable this feature. When enabled, the toggle switch will be orange.

3. Enter the timeout interval, in seconds, in the **Timeout(s)** field. If fast switching is enabled and the decoder is switched to a different stream, but the stream is not present, then the decoder will hold the last image on the screen. This image will continue to be displayed until either a new stream appears or the decoder is switched to a different stream. Once the timeout interval has expired, the screen will go black. Setting the timeout interval to `0` disables this feature and the last image will be displayed indefinitely.

> ℹ️ **NOTE:** The following table is only applicable when using the VC-2 codec.

Input Resolution (from Encoder)	Output Resolution (AT-OMNI-121)	Output Resolution (AT-OMNI-122)
1280 x 720p	1280 x 720p	1280 x 720p
1920 x 1080p @ 60 Hz	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz
> 1920 x 1080p (up to UHD)	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz

AES67 Audio

AES67 audio is a standard for high-performance audio streaming over IP, providing several features such as synchronization, media clock identification, and connection management. AES67 does not support bitstream/compressed audio formats, such as Dolby® Digital, and others. Source audio must be transmitted as LPCM up to eight channels at 192 kHz / 24-bit.

1. Login to the encoder and click **Session** in the menu bar.

2. Click the **SAP** > **Enable** toggle switch to enable SAP. When enabled, the toggle switch will be orange.

3. Locate the **Audio** section and click the **Enable** toggle switch. When enabled, the toggle switch will be orange.

4. Click the **SAVE** button to commit changes.

5. Go to the decoder and click the **SAP Listener** menu.

6. Click the **Enable** toggle switch to enable the SAP listener. When enabled, the toggle switch will be orange.
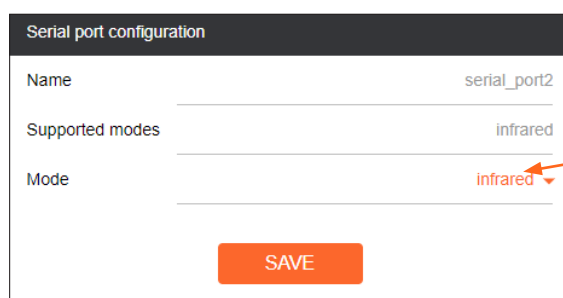
7. Click the **SAVE** button.

8. Click the **IP Input** menu.

9. Select the desired IP input for AES67 audio and click the **Enable** toggle switch. When enabled, the toggle switch will be orange. In the example below, **Input 3** is used.

10. Enter the address in the **Multicast address** field.

11. Click the **SAVE** button.

12. Click the **HDMI Output** menu.

13. Locate the **Audio** section, click the **Audio** > **Input** drop-down list, and select the input that was configured in Steps 10 and 11.

14. Click the **Enable AES67** toggle switch to enable it. When enabled, the toggle switch will be orange.

15. Click the **SAVE** button.

Descrambling

OmniStream supports 128-bit Advanced Encryption Standard (AES) scrambling and is required for HDCP-encrypted video streams. Scrambling can be enabled or disabled and is applied to individual sessions. In order to function properly, *scrambling* must be enabled on the *encoder* and *descrambling* must be enabled on the *decoder*. The scrambling and descrambling key on both the decoder and all subscribed encoders must be identical. The default scrambling/descrambling key is `scrambling`.

1. Login to the decoder.

2. Click **HDMI Output** in the menu bar.

3. Locate the **Descrambling** section and click the **Descrambling** > **Enable** toggle to enable descrambling. Once enabled, the toggle switch will be orange.

4. Enter the descrambling key in the **Key** field. This key must match the key specified on the subscribed encoder, under the **Scrambling** section.

5. Click the **SAVE** button at the bottom of the **HDMI Output** window group to commit the changes.

> ⚠️ **IMPORTANT:** If a user-defined key is specified, then it must be a minimum of eight alphanumeric characters. Special characters and spaces are not permitted. Also note that if a key is generated, the same generated key (on the encoder) must also be entered on the decoder, in order to descramble the signal.

Slate / Logo Insertion

The difference between a "slate" and "logo" is in the size of the image and how it is used: Logos are classified as smaller, low-resolution images that can be positioned at specified locations on the screen. Slates occupy the entire screen. Note that while logos may be used as slates, the image quality will be degraded, as the image will be scaled to fill the screen.

Slate / logo insertion can be performed on both the encoder and decoder. When configured on the encoder, the image that is displayed on the output (decoder) will be from the encoder IP address(es) to which each decoder is subscribed. When configured on the decoder, the image is unique to the specified HDMI output.

Adding Slates / Logos

1. Login to the encoder.

2. Click **Logo** in the menu bar.

3. Under the **New logo** window group, enter the name of the logo in the **Name** field.

4. Click the **Choose File** button and select the desired image. Only `.png` or `.svg` files are valid selections.

5. Click the **UPLOAD** button to upload the file.

6. A new window group will be created with the name of the logo that was provided in Step 3.

7. Perform one of the following:

    •   If the selected image will be used as a *logo*, then proceed with Steps 8 through 13.

    •   If the image will be used as a *slate*, skip to Step 14 on the next page.

8. Under the **Logo Insertion** window group, click the **Select Logo** drop-down list and select the desired logo. To prevent the image from being displayed, select the `Not used` option.

9. Click the **Aspect Ratio** drop-down list to set the aspect ratio of the image. Selecting `Keep` will maintain the aspect ratio. Select `Stretch` to scale the image to the defined size.

10. Enter the horizontal and vertical position of the logo, based on the resolution of the video stream, in the **Horizontal** and **Vertical** fields, respectively.

11. Enter the width and height of the logo, based on the resolution of the video stream, in the **Width** and **Height** fields, respectively.

12. Click the **Enable** toggle switch to activate the logo/slate feature. When enabled, this toggle switch will be orange.

13. Click the **SAVE** button to commit changes.

14. Click **Encoding** in the menu bar.

15. Click the **Slate mode** drop-down list, and select `Off`, `Manual`, or `Auto`.

Slate mode	Description
`Off`	Disables the image from being displayed.
`Manual`	The image will always be displayed, superimposed on the source signal, and will remain even if the source signal is lost.
`Auto`	The image will only be displayed when the source signal is lost. For example, this mode is useful in conference room applications for displaying system instructions when no sources are connected.

16. Click the **Slate logo** drop-down list and select the desired image. If **Slate Mode** is set to `Off`, then this field will not be visible.

17. Click the **SAVE** button to apply all changes.

Deleting Slates

1. Click **Encoding** in the menu bar.

2. Under the **Encoder** window group(s), click the **Slate mode** drop-down list and select `Off`.

3. Click the **SAVE** button at the bottom of the window group to commit changes.

4. Click **Logo** in the menu bar.

5. Click the **DELETE** button for the logo to be removed.

Deleting Logos

1. Click **Logo** in the menu bar.

2. Under the **Logo Insertion** window group(s), click the **Enable** button (if enabled) to disable the feature.

3. Click the **SAVE** button at the bottom of the window group to commit changes.

4. Click the **DELETE** button for the logo to be removed.

Text Insertion

Text can be inserted and scrolled across the screen, making it useful for messages and notifications. Several options are available when using text: Scroll speed adjustment (forward, reverse, or static), number of iterations, text color, vertical / horizontal position, as well as transparency.

1. Login to the decoder.

2. Click **Text** in the menu bar.

3. Under the **Text Insertion** window group, click the **Enable** toggle switch. When enabled, this toggle switch will be orange.

4. In the **Text** field, enter the desired text.

5. Specify the speed of the scrolling text in the **Scroll Speed** field. Integer values from `-255` to `255` are valid. Negative numbers will scroll the text from left to right. Positive numbers will scroll text from right to left. A value of `0` will not scroll.

6. Enter the number of iterations in the **Iteration** field. Set this field to 0 (zero) to set the number of iterations to infinity.

7. Click the **Color** drop-down list to select the color of the text. The **Red**, **Green**, and **Blue** fields can be changed to further modify the color of the text. Adjust the **Alpha** field to control the transparency of the text. A value of 255 is opaque and a value of 0 is transparent. Numbers from 0 to 255 are valid for each of these fields.

8. Specify the location of the text in the **Horizontal (%)** and **Vertical (%)** fields. Each of these values is based on the horizontal and vertical resolution of the video stream.

9. Specify the size of the text in the **Width (%)** and **Height (%)** fields. Each of these values is based on the horizontal and vertical resolution of the video stream.

10. Click the **SAVE** button to commit all changes.

Configuring a Static IP Address

There will be situations where it is desirable for the encoder to be assigned a static IP address. Some IT environments prefer this method, as opposed to having a DHCP server dynamically assign IP addresses. If the decoder is unable to detect a DHCP server within 15 seconds, then Automatic Private IP Addressing (APIPA) will be used to assign the encoder an address within the IPv4 address block `169.254.xxx.xxx/16`. If this occurs, connect an Ethernet cable directly from the **ETHERNET** port of the encoder to the LAN port of a computer, then follow the instructions below.

1. Login to the web server and click **Network** in the menu bar.

2. Click the **Mode** drop-down list and select `static`.

3. Enter the desired IP address in the **IP address** field.

4. Enter the subnet mask in the **Subnetmask** field.

5. Enter the gateway (switch/router) address in the **Gateway** field.

6. Click the **SAVE** button to commit all changes.

Creating Video Walls

Introduction

Before proceeding with creating video walls, review the tables below. These tables provide information on video wall size, maximum timing, color space, and bit depth.

> **ℹ** **NOTE:** OmniStream video walls do not support interlaced sources.

The following table lists the maximum video wall size, based on the resolution of the source.

Resolution	Maximum Video Wall Size
4Kp60	2 x 2
4Kp30	16 x 16
1080p60	n x n (no limit)

The following table provides maximum timing, color space, and bit-depth specifications when video walls are enabled.

Number of Channels	Resolution	Refresh Rate	Color Space	Bit Depth
1	1920 x 1080p	60 Hz	4:4:4	12-bit
2	1920 x 1080p	30 Hz	4:4:4	12-bit

> **ℹ** **NOTE:** When video walls are enabled, the output resolution at the decoder endpoint is dependent on both the number of channels on the decoder and the input resolution received from the encoder. Refer to the table below for details.

Input Resolution (from Encoder)	Output Resolution (AT-OMNI-121)	Output Resolution (AT-OMNI-122)
1280 x 720p	1280 x 720p	1280 x 720p
1920 x 1080p @ 60 Hz	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz
> 1920 x 1080p (up to UHD)	1920 x 1080p @ 60 Hz	1920 x 1080p @ 30 Hz

Landscape Mode

The following diagram will be used to illustrate how to configure a 2 x 2 video wall.   The details of this diagram are listed below:

- Four decoders are subscribed to a single encoder. Each decoder is connected to a display.
- The encoder is transmitting a 3840 x 2160 video signal.
- The top two displays have been accidentally mounted upside down.

Figure 1.1: Landscape-mode 2x2 video wall requiring adjustment.

This diagram presents some challenges that need to be met:

a. Since there are four displays, the image from each decoder will need to be scaled to one-fourth of the total resolution. The crop-and-scale feature will be used to provide the correct output.

b. The top two displays have been mounted upside-down. To meet this challenge, the rotate feature will be applied to these two displays.

Note that the order in which each image is cropped, scaled, and/or rotated is arbitrary. In this example, the configuration process will begin with Display 1, in the top left.

1. Login to the decoder and click the **HDMI Output** menu.

2. Under the **Video** section, click the **Stretch/Crop Mode** drop-down list and select **Full Screen**. This guarantees that the image will fill the screen.

3. Click the **Resolution** drop-down list and select `1920x1080`. This will scale the output resolution to 1920x1080.

4. Under the **Video Wall** section, click the **Enable** toggle switch to activate the **Video wall** option. Once enabled, the **Video wall** section will be expanded and display all available options.

5. Click the **Unit** drop-down list to select the unit of measure. In this example, **Pixels** (the default value) will be used.

⚠️ **IMPORTANT:** When using Millimeters or Inches, two additional fields will be available: **Total display width** and **Total display height**. When entering these values, the following requirement must be observed: **Total display width** must be greater than or equal to the display width. **Total display height** must be greater than or equal to the display height.

---

6. Enter the horizontal and vertical resolution of the portion of the source stream that will displayed on this decoder in the **Width** and **Height** fields. The table on the next page, lists width and height examples for a 2x2 video wall, with the specified source resolution.

7. Enter the starting coordinates of the portion of the source stream that will be displayed on this decoder in the **Horizontal** and **Vertical** fields.. These values are the pixel start position (upper left most pixel). The table below lists left and right coordinates for a 2x2 video wall, with the specified source resolution.

7	Horizontal	0
7	Vertical	0
8	Rotation (°)	0 ▾

Table listing width and height examples for 2x2 video wall.

Source resolution	Width (pixels)	Height (pixels)
3840 x 2160 (UHD)	1920	1080
1920 x 1080 (1080p)	960	540

Table listing left and right coordinates for a 2x2 video wall.

Source resolution	Upper Left	Upper Right	Lower Left	Lower Right
3840 x 2160 (UHD)	0, 0	1920, 0	0, 1080	1920, 1080
1920 x 1080 (1080p)	0, 0	960, 0	0, 540	960, 540

8. Click the **Rotation** drop-down list to select the rotation angle of the image. In this example, select `180` from the drop-down list. The image will be flipped, vertically. This step is only applied when configuring the two top displays.

> **NOTE:** 0 and 180 used for landscape mode video walls and 90 and 270 for portrait mode. Refer to Portrait Mode (page 63) for more information.

The image on Display 1 in the upper-left corner, as illustrated below, has been cropped and rotated and is now displayed correctly. At this point, one-fourth of the video wall has been configured.

Figure 1.2: Landscape-mode 2x2 video wall requiring adjustment.

9. Click the **SAVE** button at the bottom of the screen to commit changes.

10. Repeat steps 3 through 9 for decoders 2, 3, and 4. Note that in the example below, decoders 3 and 4 will not require any rotation. Therefore, make sure the **Rotation** option is set to 0 for decoders 3 and 4.

> ⚠️ **IMPORTANT:** When using dual-channel decoders, the **Rotation** feature can only be used when a single HDMI channel is active. Image rotation is not supported on dual-channel decoders when both HDMI channels are active. Single-channel decoders do not have this restriction.

Once all four decoders have been properly configured, the image will be correctly displayed across all four displays. Refer to the illustration on the next page.

11. Check the image, on each display, and make sure they are aligned correctly with the other images on the video wall. Use the **Edge Compensation** drop-down list to adjust bezel compensation, if necessary. Refer to Bezel Compensation (page 68) for more information.

Figure 1.3: Landscape-mode 2 x 2 video wall displayed correctly.

Portrait Mode

> ⚠️ **IMPORTANT:** Portrait Mode is only supported on single-channel decoders.

Images can be rotated 90° or 270° to create portrait-oriented video walls. The steps to configure portrait-oriented video walls is very similar to creating landscape video walls.

A similar scenario to the landscape video wall challenge will be used to illustrate how to configure a 1 x 4 portrait-oriented video wall.   The details of this diagram are listed below:

- Four decoders are subscribed to a single encoder. Each decoder is connected to a display.
- The encoder is transmitting a 3840 x 2160 video signal.
- Display 2 and 3 have been mounted upside-down.

Figure 2.1: Portait-mode video wall requiring adjustment.

As with the landscape video wall, this diagram presents some challenges that need to be met:

a.   Since there are four displays, the image from each decoder will need to be scaled to one-forth of the total resolution. The crop-and-scale feature will be used to provide the correct output.

b.   Display 2 and 3 have been mounted upside-down. To meet this challenge, the images must be flipped horizontally and rotated 90°, which gives a total rotation angle of 270°. Display 1 and 4 only need to be rotated 90°.

Note that the order in which each image is cropped, scaled, and/or rotated is arbitrary. In this example, the configuration process will begin with Display 1.

1. Login to the decoder and click **HDMI Output** in the menu.

2. Under the **Video** section, click the **Stretch/Crop Mode** drop-down list and select **Full Screen**. This guarantees that the image will fill the screen.

3. Click the **Resolution** drop-down list and select `1920x1080`. This will scale the output resolution to 1920x1080.

4. Under the **Video Wall** section, click the **Enable** toggle switch to activate the **Video wall** option. Once enabled, the **Video wall** section will be expanded and display all available options.

5. Click the **Unit** drop-down list to select the unit of measure. In this example, **Pixels** (the default value) will be used.

6. Enter the horizontal and vertical resolution of the portion of the source stream that will displayed on this decoder in the **Width** and **Height** fields. The table on the next page, lists width and height examples for a 1x4 video wall, with the specified source resolution.

> **NOTE:** In the 1x4 scenario shown, the height will need to match the height of a 4K image, so the width needs to be set to `1080` and the height needs to be set to `2160`.

7. Enter the starting coordinates of the portion of the source stream that will be displayed on this decoder in the **Horizontal** and **Vertical** fields. These values are the pixel start position (upper left most pixel). The table on the next page lists left and right coordinates for a 1x4 video wall, with the specified source resolution.

8. Click the **Rotation** drop-down list to select the rotation angle of the image. In this example, select **90** from the drop-down list to rotate the image as portrait. The image on Display 1 is now cropped and rotated and is displayed correctly. At this point, one-fourth of the video wall has been configured.

9. Click the **SAVE** button at the bottom of the screen to commit changes.

Video Wall	Enable	⬤
	Unit	pixels ▼
	Width	1920
	Height	1080
❼	Horizontal	0
❼	Vertical	0
❽	Rotation (°)	0 ▼

| Type | DispSW AVon ▼ |
| ❾ | SAVE |

> ℹ️ **NOTE:** 0 and 180 used for landscape mode video walls and 90 and 270 for portrait mode. Refer to Portrait Mode (page 63) for more information.

Table listing width and height examples for 1x4 video wall.

Source resolution	Width (pixels)	Height (pixels)
3840 x 2160 (UHD)	1920	1080
1920 x 1080 (1080p)	960	540

Table listing left and right coordinates for a 1x4 video wall.

Source resolution	Upper Left	Upper Right	Lower Left	Lower Right
3840 x 2160 (UHD)	0, 0	1920, 0	0, 1080	1920, 1080
1920 x 1080 (1080p)	0, 0	960, 0	0, 540	960, 540

The image on Display 1 is now cropped and rotated and is displayed correctly. At this point, one-fourth of the video wall has been configured.

Figure 2.2: Portait-mode 1 x 4 video wall with Display 1 properly oriented.

10. Repeat steps 3 through 9 for decoders 2, 3, and 4. Since display 2 and 3 were mounted upside-down, they will require a rotation of 180° (to flip horizontally) + 90° (to align them as portrait), giving a total rotation of 270°.

⚠️ **IMPORTANT:** When using dual-channel decoders, the **Rotation** feature can only be used when a single HDMI channel is active. Image rotation is not supported on dual-channel decoders when both HDMI channels are active. Single-channel decoders do not have this restriction.

Once all four decoders have been properly configured, the image will be correctly displayed across all four displays. Refer to the illustration on the next page.

11. Check the image, on each display, and make sure they are aligned correctly with the other images on the video wall. Use the **Edge Compensation** drop-down list to adjust bevel compensation, if necessary. Refer to Bezel Compensation (page 68) for more information.

Figure 2.3: Portait-mode 1 x 4 video wall displayed correctly.

Bezel Compensation

Displays have a region where video is not displayed, called the bezel. This can cause display issues when creating video walls. Bezel compensation takes this area into account when a single video source is mapped across multiple displays. Bezel compensation can be adjusted at any time.

The illustration on the left shows a simple 2x2 video wall without bezel compensation. Note how the Atlona logo appears stretched, horizontally. On the right, bezel compensation is used to correct the image.

Image without bezel compensation

Image with bezel compensation applied

Bezel

1. Under the **Video Wall** section, click the **Edge compensation** drop-down list and select `Bezel compensation`.

2. Enter the **Top**, **Bottom**, **Left**, and **Right** values, as desired. Values can be entered in pixels, inches, or millimeters.

3. Click the **SAVE** button at the bottom of the **Output** window group to commit changes.

Configuration and Management Interfaces

Web Server

> **NOTE:** This section assumes that the **System mode** is set to `VCx`. If `VC-2 Video` is used, some features on these pages will not be available.

System information page

Firmware version
The version of firmware that the decoder is running. Always make sure the latest version of firmware is installed.

FPGA
Displays the FPGA model number and the size.

Model
The model number of the unit.

System mode
Click this drop-down list to select the system mode. The default setting is `VCx`.

Mode	Description
VCx	This is the default mode and represents the latest codec technology from Atlona, with outstanding support for computer graphics and motion video. VCx includes support for 4K60 4:4:4 fast switching, dual streaming from AT-OMNI-111 encoders, and multiview on the decoders.
VC-2 Video	Legacy OmniStream codec that provides the best viewing experience when streaming motion graphics and/or video.

Description
Provides the option of assigning descriptive name to the unit.

Location
Provides the option of assigning a description of where the unit is located.

Timezone
Displays the time zone format. Click the **SET TIMEZONE** button, to assign the time zone.

Date/Time
Displays the current date and time. Click the **SET DATE/TIME** button to set these values.

Uptime
Displays the elapsed time since the unit was powered-on or rebooted.

System Temperature
Displays the ambient enlosure temperature.

Die Temperature
Displays the value returned from the die temperature sensor (DTS) on the chip of the PCB.

Power Consumption
Displays the precise power consumption of the encoder.

Hostname
Displays the hostname of the encoder. By default, OmniStream encoders are assigned a default hostname, which is constructed as follows: at-omni-[SKU]-[last five digits of serial number]. If using a custom hostname, it must meet the hostname standards, defined here: https://tools.ietf.org/html/rfc1123.

NTP Server
Displays the NTP server. This field is set to `pool.ntp.org` by default. Click this field to enter the desired NTP server address.

Buttons
Click this toggle switch to enable or disable the front-panel buttons. If the buttons are disabled, their backlight turns off. When enabled, the toggle switch will be orange.

LEDs
Click this toggle switch to enable or disable *all* front-panel LED indicators and button backlight indicators.

SET DATE/TIME
Click this button to set the current date and time.

SET TIMEZONE
Click this button to set the desired time zone.

FACTORY RESET
Click this button to reset the encoder to factory-default settings. When performing a factory reset, the following options can be selected, by clicking the check box. If no options are selected, then the encoder is reset with no factory-default settings.

Option	Description
None Checked	Resets the decoder with factory-default settings.
Reset User	Resets the decoder to factory-default settings and resets custom user information.
Reset Network	Resets the decoder to factory-default settings and resets network information.
Reset Defaults	Resets the encoder to factory-default settings and restores a default device configuration that includes defined multicast addresses.

IDENTIFY
Click this button to physically identify a unit on the network. Clicking this button will cause all front-panel LED indicators to flash for 10 seconds.

DEBUG
Click this button to instruct the unit to create a debug file. This file is used by Atlona Technical Support Engineers to diagnose internal issues with the unit.

REBOOT
Click this button to perform a soft reboot of the encoder.

SAVE
Click this button to commit changes to the settings on this page.

SAP Listener page

Enable
Click this toggle to enable or disable SAP. This feature is enabled when the toggle switch is orange. This is the default setting. If an SAP announcement is picked up, it will be displayed below the **SAP** window group (as shown here).

Addresses
Encoders currently send SAP announcements on two multicast addresses: `224.2.127.254` and `239.255.255.255`. These IP addresses are added by default.

SAVE
Click this button to save all changes

⚠️ **IMPORTANT:** If the **Addresses** field is changed, then the same changes must be applied to all devices, in order for all devices to see the SAP multicast.

IP Input page

Input window groups

Name
The name of the input. This field cannot be changed.

Enable
Click this toggle switch to enable or disable the IP input.

Interface
The AT-OMNI-521 has only one Ethernet interface.
This field cannot be changed.

Multicast address
Enter the multicast IP address of the subscribed encoder in this field.

Multicast filter (IGMPv3) > Mode
Click this drop-down list to select the multicast filtering mode. Available options are `exclude` or `include`.

Multicast filter (IGMPv3) > Addresses
Enter the desired address(es) in this field. Separate multiple multicast IP addresses with a comma delimiter.

Port
Enter the port number of the subscribed encoder in this field.

SAVE
Click this button to commit all changes in the **Input** window group.

SHOW MORE
Click this button to expand the list of available Input window groups.

Serial page

Serial port configuration window groups

Name
The name of the serial port. This field cannot be changed.

Supported Modes
Displays the supported protocols for the serial port. This field cannot be changed.

Mode
Click this drop-down list to select the desired serial mode. Available values will be reflected in the **Supported Modes** field.

Baudrate
Click this drop-down list to select the desired baud rate: `115200`, `57600`, `38400`, `19200`, or `9600`.

Data
Click this drop-down list to select the number of data bits: `6`, `7`, or `8`.

Parity
Click this drop-down list to select the parity bit: `None`, `Odd`, `Even`, `Mark`, or `Space`.

Stop
Click this drop-down list to select the stop bit: `1`, `1.5`, or `2`.

Flow Control
Click this drop-down list to select the type of flow control: `none`, `xonxoff`, or `hw`.

SAVE
Click this button to commit all changes within the **Serial port configuration** window group.

Serial configuration window groups

The following fields apply to both **Serial configuration** window groups.

Name
The name of the port. This field cannot be changed.

Port
Click this drop-down list to select the desired serial port.

Mode
Click this drop-down list to select the desired control mode. Available values are: `cli`, `tcpproxy`, and `output`. Select `tcpproxy` to translate received IP control traffic to RS-232 output. Selecting the `cli` option will force the serial port to function as a Command-Line Interface (CLI) for control of the encoder. Refer to Device Control (page 35) for more information.

SAVE
Click this button to commit all changes within the **Serial configuration** window group.

Command window groups

By default, window groups for the following commands are created: **Display Off**, **Display On**, **Volume Down**, and **Volume Up**.

Interpret on
Click this drop-down list to select the endpoint where the command will be processed: **encoder** or **decoder**.

ASCII
Enter the ASCII representation of the command string in this field.

HEX
Enter the hexadecimal representation of the command in this field.

SAVE
Click this button to commit all changes within the **Command** window group.

> **NOTE:** When entering the command string, it is not required to enter the string under both the ASCII and HEX fields. The encoder requires that one field be completed.

New Command
Click this button to create a new command window group. Provide a name for the command in the displayed dialog box, then click the **Create** button. Complete each of the fields, as described above.

HDMI Output page

Output window groups

Dual-channel decoders have two **Output** window groups and the following fields apply to both **Output** window groups.

Name
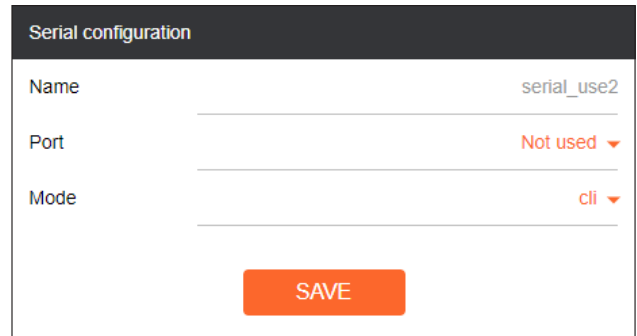The name of the output port. This field cannot be changed.

Descrambling > Enable
Click this toggle switch to enable or disable scrambling. If a scrambling key is used on the subscribed encoder, then descrambling must be enabled on the decoder in order for the source signal to reach the sink device.

Descrambling > Key
Enter the descrambling key in this field. This key must match the scrambling key on the subscribed encoder.

HDCP > Encrypted
This indicator will be green if the stream content is HDCP-encrypted.

HDCP > Version
Click this drop-down list to select the supported version of HDCP.

HDCP > Negotiated version
Displays the version of HDCP used by the stream.

EDID
This field will display the EDID of the connected display. This raw data can be copied and stored under the EDID, if desired.

Video > Input
Click this drop-down list to select the desired IP input. Available options are `ip_input1` - `ip_input16`, `none`, `generator`, and `multiview` (if configured).

HDCP	Encrypted	🟢
	Version	1.4 ▾
	Negotiated version	1.4
EDID	00ffffffffffff004c2d7c0b00000000331701038059327 80aee91a3544c99260f5054bdef80714f81c081008 1809500a9c0b3000101023a801871382d40582c4 50076f23100001e662156aa51001e30468f330076f
Video	Input	ip_input1 (226.0.0.1:1000) ▾
	Input status	1920x1080p, 59.94 fps, RGB 444 8bpc
	Status	1920x1080p, 59.94 fps, RGB 444 8bpc
	HDR	🔴
	Stretch/crop mode	keep aspect ratio ▾

Video > Input status
Displays the input status. If no video stream is detected, then "No active video" will be displayed.

Video > Status
Displays the active video input. If no input is active or detected, then this field will display "No active video".

Video > HDR
This indicator will be green if HDR video is present.

Video > Stretch / Crop Mode
Click this drop-down list to select the aspect ratio.

Mode	Description
Keep Aspect Ratio	Aspect ratio is preserved; the output on the decoder will be the same as the input on the encoder.
Full Screen	Stretches the image to fill the screen. In some cases this can distort ("stretch") the image.
16:9	Sets the aspect ratio to 16:9 "widescreen" format, usually associated with HDTV formats.
16:10	Sets the aspect ratio to 16:10 "widescreen" format, usually associated with computer displays and smart devices.
4:3	Sets the aspect ratio to 4:3 "pan-and-scan" format, usually associated with SDTV.

Video > Resolution
Click this drop-down list to select the desired output resolution. This is a scaler feature which can either upscale or downscale the output on the decoder. If `Input` is selected, then no scaling will be applied to the output. Select `Auto` to use the EDID of the sink device to determine the output resolution.

Resolutions	
`Input`	`1440x1050`
`Auto`	`1440x900`
`4096x2160`	`1280x1024`
`3840x2160`	`1280x800`
`1920x1200`	`1280x768`
`1920x1080`	`1280x720`
`1680x1050`	`1024x768`
`1600x900`	

NOTE: When working with VESA resolutions 1360x768p60 and 1366x768p60, the **Resolution** drop-down list must be set to `Auto`.

Video > Framerate
Sets the output frame rate. Available options are `auto`, `60 Hz`, `50 Hz`, and `30 Hz`, except for the AT-OMNI-122 where the options are `auto` and `30 Hz`.

Video > Slate Mode
Click this drop-down list to select the slate mode. Refer to Slate / Logo Insertion (page 54) for more information.

Mode	Description
`Off`	Disables the image from being displayed.
`Manual`	Stretches the image to fill the screen. In some cases this can distort ("stretch") the image.
`Auto`	The image will only be displayed when the source signal is lost. For example, this mode is useful in conference room applications for displaying system instructions when no sources are connected.

Video Wall > Enable
Click this toggle switch to enable or disable the video wall option. Refer to Creating Video Walls (page 58) for more information on using video walls.

Video Wall > Unit
Click this drop-down list to specify the units. Available options are `pixels`, `mm`, and `inches`.

Video Wall > Width
Specifies the width of the video wall.

Video Wall > Height
Specifies the height of the video wall.

Video Wall > Horizontal
The number of video wall rows.

Video Wall > Vertical
The number of video wall columns.

Video Wall > Rotation
Adjusts the rotation angle of the image. Available options are `0`, `90`, `180`, and `270`.

Video Wall > Edge compensation
Adjusts edge compensation. Available options are `none`, `bezel compensation`, and `edge blending`.

Video Wall > Top
Offset value for adjusting the top portion of the image. Units are specified in the **Unit** field.

Video Wall > Bottom
Offset value for adjusting the bottom portion of the image. Units are specified in the **Unit** field.

Video Wall > Left
Offset value for adjusting the left portion of the image. Units are specified in the **Unit** field.

Video Wall > Right
Offset value for adjusting the right portion of the image. Units are specified in the **Unit** field.

Fast Switching > Enable
Click this toggle switch to enable or disable fast-switching. When enabled, the fast-switching timeout interval can also be adjusted. Refer to Fast Switching (page 48) for more information.

Fast Switching > Timeout (s)
Enter the timeout interval in seconds.

Audio > Input
Click this drop-down list to select the primary audio IP input. Select the `Not Used` option to leave the audio input unassigned.

Audio > Downmixing
Click this drop-down list to select how LPCM audio will be down-mixed. Note that lossless audio formats cannot be down-mixed.

Audio > Enable AES67
Click this toggle switch to enable or disable AES67. When enabled, the toggle switch will be orange. Refer to AES67 Audio (page 50) for more information.

Status
Displays the active audio input. If no input is active or detected, then this field will display "No active audio".

Mute
Click this toggle switch to enable or disable the audio output. If enabled, the toggle switch will be orange.

Audio > Volume
Click the speaker icon on the left to decrease volume. Click the speaker icon on the right to increase volume. Range: 0 to 15.

AUX (CEC)
Click this drop-down list to select the desired IP input for CEC control. Available options are `ip_input1` - `ip_input12`, `none`, and `generator`.

Standby > Auto On
Click this toggle switch to enable or disable power-on. When enabled this toggle switch will be green and the power-on command will be sent to the display when an A/V signal is detected.

Standby > Projector Cooldown (s)
Enter the time interval, in seconds, before the projector can be powered-off. This time interval prevents the decoder from sending additional commands until the projector has had time to complete its cool-down process.

Standby > Timeout (s)
Enter the time interval, in seconds, before the next command can be accepted by the display.

Standby > Type
Click this drop-down list to select the display mode.

Type	Description
DispSW AVon	Display switches on/off, source audio/video signal always on.
DispSW AVSW	Display switches on/off, source audio/video signal switches on/off.
AV SW	Display is always on, source audio/video signal switches on/off
Always on	Display is always on, source audio/video signal always on.

SAVE
Click this button to commit all changes within the **Output** window group.

Logo page

New logo window group

Name
Enter a name for the logo in this field.

Choose File
Click this button to select the logo file to be uploaded. Files must be in `.png` or `.svg` format and must not exceed 5 MB (5120000 bytes) in size. When an image file is uploaded, it will appear in the **Logo** drop-down list.

UPLOAD
Click this button to upload the logo file to the decoder.

Logo Insertion window groups

The following fields apply to both **Logo Insertion** window groups. The single-channel encoder will only have one **Logo Insertion** window group.

Target
Displays the name of the encoder. This field cannot be changed.

Enable
Click the toggle switch to enable or disable the logo. If the toggle switch is orange, then the logo will be enabled.

Logo
Click this drop-down list to select the desired logo. To disable the use of a logo, set to `Not Used`.

Aspect Ratio
Click this drop-down list to select the type of aspect ratio to be applied to the logo.

Horizontal (%)
Enter the horizontal position of the logo based on the resolution of the video stream.

Vertical (%)
Enter the vertical position of the logo based on the resolution of the video stream.

Width (%)
Enter the width of the logo. This value is based on the horizontal resolution of the video stream.

Height (%)
Enter the height of the logo. This value is based on the vertical resolution of the video stream.

SAVE
Click this button to commit all changes within the **Logo Insertion** window group.

Location	Horizontal (%)	0
	Vertical (%)	0
Size	Width (%)	10
	Height (%)	10

SAVE

Text page

Text insertion window group

This decoder will only have one **Text insertion** window group.

Target
Displays the name of the output where the text will appear. This field cannot be changed.

Enable
Click this toggle switch to enable or disable the text. When the toggle switch is orange, the text will be enabled.

Text
Enter the desired text in this field.

Scroll Speed
Enter the scrolling speed in this field. Values from -255 to 255 are valid. Negative numbers will scroll the text from left to right. Positive numbers will scroll text from right to left.

Iterations
Enter the number of iterations in the **Iteration** field. Set this field to `0` (zero) to set the number of iterations to infinity.

Color
Click this drop-down list to select a solid color preset: `red`, `green`, `black`, `white`, `yellow`, or `blue`.

Color > Red, Green, Blue, Alpha
Click these fields to fine tune the color of the text. Adjust the **Alpha** field to control the transparency of the text. An alpha value of `255` is opaque and a value of 0 is transparent. Numbers from 0 to 255 are valid for all fields.

Location > Horizontal
Enter the horizontal position of the text, based on the resolution of the video stream.

Location > Vertical
Enter the vertical position of the text, based on the resolution of the video stream.

Location > Width
Enter the width of the text. This value is based on the horizontal resolution of the video stream.

Location > Height
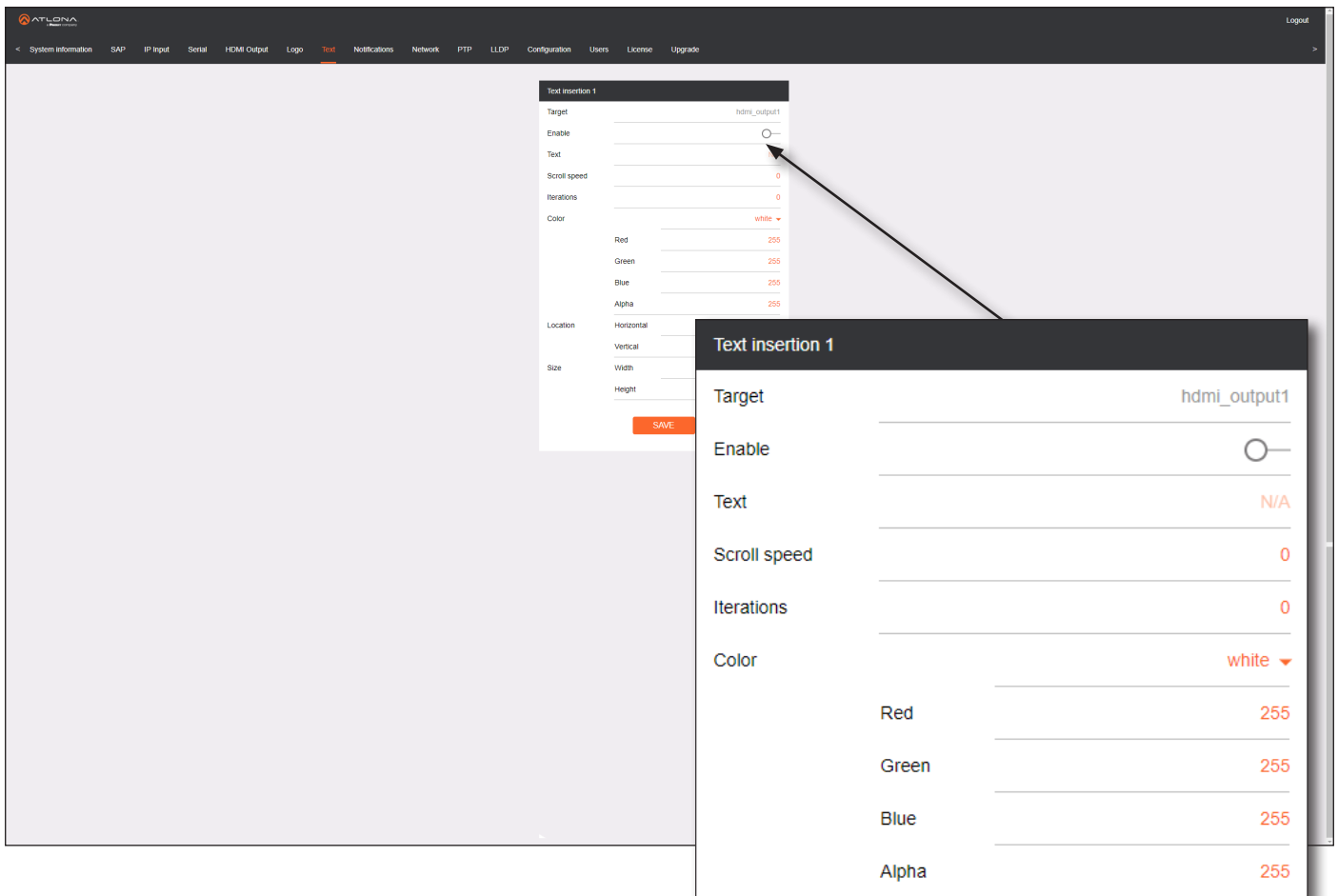Enter the height of the text. This value is based on the vertical resolution of the video stream.
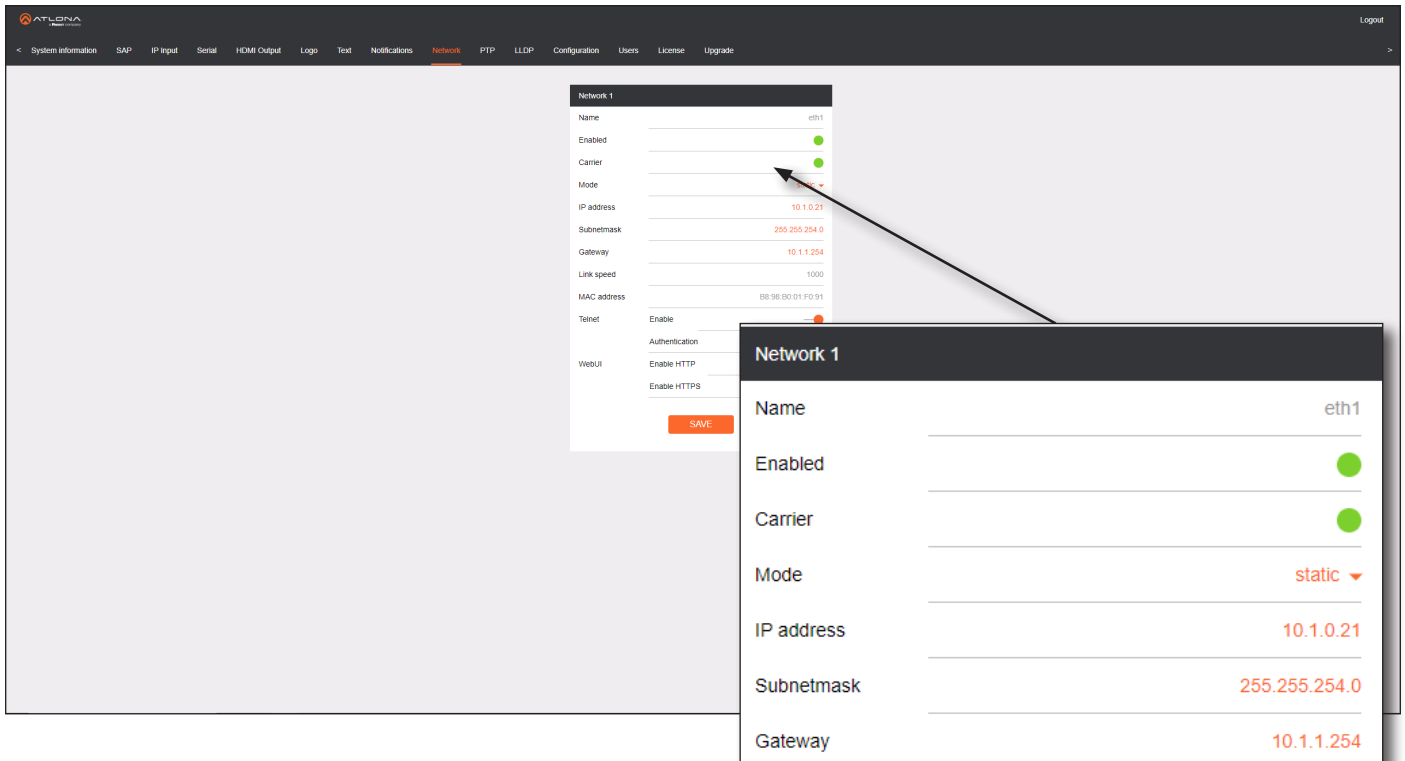
SAVE
Click this button to commit all changes within the **Text insertion** window group.

Location	Horizontal	0
	Vertical	0
Size	Width	10
	Height	10

SAVE

Network page

Network window groups

The following fields apply to both **Network** window groups. The single-channel decoder will only have one **Network** window group.

Name
Displays the name of the Ethernet interface. This field cannot be changed.

Enabled
This indicator displays the state of the Network Interface Card (NIC). If the indicator is green, then the NIC is in the up/up state.

Carrier
If this indicator is green, then an active link exists. Otherwise, if no link exists, this indicator will be red.

Mode
Click this drop-down list to select the desired IP mode. Select `DHCP` to let the DHCP server (if present) assign the encoder the IP settings. When `static` is selected, the information for the **IP Address**, **Subnetmask**, and **Gateway** fields must be entered.

IP Address
Displays the IP address used by the channel. This field can only be changed if **Mode** is set to `static`.

Subnetmask
Displays the subnet mask for the channel. This field can only be changed if **Mode** is set to `static`.

Gateway
Displays the gateway (router) address for the channel. This field can only be changed if **Mode** is set to `static`.

Link speed
Displays the Ethernet interface link speed in Mbps. This field cannot be modified.

MAC address
Displays the MAC address of the Ethernet interface.

Telnet > Enable
Click this toggle switch to enable or disable Telnet. If disabled, then Telnet sessions to the decoder cannot be established.

Telnet > Authentication
Click this toggle switch to enable or disable Telnet authentication. If enabled, then the toggle switch will be orange. Once enabled, connecting to the decoder using Telnet will require login credentials. The default credentials are:

Username: `admin`
Password: `Atlona`

WebUI > Enable HTTP
Click this toggle switch to enable or disable HTTP. If disabled, traffic on port 80 is forbidden.

WebUI > Enable HTTPS
Click this toggle switch to enable or disable HTTPS. If disabled, traffic on port 443 is forbidden.

SAVE
Click this button to commit all changes within the **Network** window group.

PTP page

The **PTP** page provides options for adjust Precision Time Protocol (PTP) for AES67 audio streams. PTP is used by AES67 to keep all audio streams synchronized.

For a system utilizing PTP, all devices undergo an automatic self-election process to choose the device to be used as the PTP grandmaster (GM) clock, based on the accuracy of the device's clock and the device's configured priority. A lower priority number means the device is more likely to get selected as the GM. OmniStream runs 1 PTP daemon per Ethernet interface.

> ⚠️ **IMPORTANT:** If a new device is added to the network and the GM changes, a brief outage will be experienced while all connected devices synchronize with the new clock. Because of this, Atlona recommends that one unit gets manually defined as the GM and have both **Priority 1** and **Priority 2** fields be set to 1.

eth window group

Interface
Displays the Ethernet interface associated with the PTP settings.

Domain Number
Enter the domain number in this field. Valid entries are 0 through 127.

Priority 1
Enter the priority number in this field.

Priority 2
Enter the priority number in this field.

TTL
Displays the TTL value. The default IPV4 TTL value used for PTP is 8.

Is GM
If the indicator is green, then this interface is the PTP GM.

GM Identity
The grandmaster clock identity.

Master Offset
Displays the grandmaster clock offset.

SAVE
Click this button to commit all changes.

TTL	8
Is GM	🟢
GM Identity	B8:98:B0:FF:FE:01:A9:60
Master offset	7633 ns

SAVE

LLDP page

The Link Layer Discovery Protocol (LLDP) page returns information about the switch that is connected to the decoder.

> ℹ️ **NOTE:** LLDP must be enabled on the switch that the decoders are connected to, in order for the switch information to be displayed.

Via
The discovery protocol being used.

RID
The router ID.

Age
Up-time of the interface.

Chassis > **ID**
The MAC address of the interface.

Chassis > **Capability**
Indicates the device function, such as bridge (switch), router, etc.

Port > **ID**
The port ID.

Port > **TTL**
The Time-To-Live value.

Refresh
Click this button to refresh the page after a port change.

Configuration page

Import configuration

Choose File
Click this button to select the desired configuration file to be uploaded.

IMPORT
Click this button to upload the selected configuration file to the encoder. The hostname, specific to the configuration filename, will be ignored.

Export configuration

EXPORT
Click this button to export the current encoder system configuration to a .json file.

Upload SSL certificate

Choose File
Click these buttons to select the desired certificate or private key.

UPLOAD
Click this button to upload the certificate/private key to the encoder.

REVERT
Click this button to restore the previous configuration.

Users page

User window groups

The following fields apply to all **User** window groups.

Username
Enter the desired username in this field.

Role
Click this drop-down list to select the desired role of the user. Available options are: `administrator`, `operator`.

New password
Enter the desired password for the username in this field.

Repeat password
Confirm the new password by entering it in this field.

DELETE
Click this button to delete the user in the current window group. Note that the at least one admin role must exist at all times. Therefore, if one **admin** role and one **operator** role exist, then the **admin** user cannot be deleted.

SAVE
Click this button to commit all changes within the current user window group.

New user
Click this button to create a new user. Provide the role and password, as described in the fields above.

Configuration and Management Interfaces

License page

This page displays all installed licenses and allows additional licenses to be installed.

License info window group

This window group lists all installed licences, along with the key code and request codes

INSTALL LICENSE
Click this button to validate and install the license.

Upgrade page

This page is used to update the firmware on the encoder.

Upgrade window group

Choose File
Click this button to select the firmware file to be uploaded.

UPLOAD
Click this button to upload the selected firmware file.

Appendix

Updating the Firmware

Follow the procedure below to update OmniStream units using the built-in web server.

1. Launch the desired web browser and enter the IP address of the encoder/decoder in the address bar.

2. Enter the username and password. Note that the password field will always be masked. The default credentials are:

    Username: `admin`
    Password: `Atlona`

3. The **System Information** page will be displayed.

4. Click **Upgrade** in the menu bar to display the **Upgrade** page.

5. Click the **Choose File** button.

6. In the **Open** dialog box, select the correct firmware file. Refer to the table below.

Firmware file	OmniStream SKU
`at-omni-single-upgrd-os-[version].vpup2`	AT-OMNI-111 AT-OMNI-121 AT-OMNI-111-WP
`at-omni-dual-upgrd-os-[version].vpup2`	AT-OMNI-112 AT-OMNI-122
`at-omni-residential-upgrd-os-[version].vpup2`	AT-OMNI-512 AT-OMNI-521

7. Click the **UPLOAD** button.

8. A progress bar will be displayed, indicating the current upgrade status of the unit. When firmware update process has completed, the **Upgrade** page will be displayed.

Performing a Link Test

Follow the procedure below to perform a link integrity test between an encoder and decoder(s).

1. Launch a web browser and enter the IP address of the encoder in the address bar.

2. Open another tab in the browser and enter the IP address of the subscribing decoder in the address bar.

3. Verify that all desired decoders are subscribed to the encoder's multicast address and port number. In the decoder example below, the **IP Input** > **Input 1** > **Multicast address** field is set to `225.0.0.11`. This is the same IP address that is assigned to the **Session** > **Session 1** > **Destination IP address** field on the encoder.

4. On the encoder, click the **Session** menu.

5. Under the **Video** section, click the **Link test** button.

6. An orange screen with a progress bar will be displayed during the testing procedure.

7. After the test, the encoder web page will automatically redirect to the **Notifications** tab where the user can see the results.

   If the test passed, information similar to the following will be displayed. Note the information in the **Description** field: "100% of packets received by ..." indicates no packets were dropped / zero loss.

If the test fails, it could be that less than 100% of packets are received, indicating connectivity, but with some amount of packet loss. If it shows "No one replied!" or if the target decoder is not shown in results, it could indicate that there is a connectivity issue or that the decoder is not subscribed to the correct video multicast address.

Hovering the mouse over the **Description** field will provide the full IP address of each decoder which received the test, as shown below. If multiple decoders were tested, additional IP addresses will be displayed.

8.   Go to the **Notifications** menu on the decoder.

If the test passed, information similar to the following will be displayed. Note the information in the **Description** field: "100% of packets received ..." indicates no packets were dropped / zero loss.

Hovering the mouse over the **Description** field will display the full IP address of the encoder from where the packets originated.

9.   Click the **CLEAR** button to remove the test results from the **Notification** page.

Mounting Instructions

OmniStream decoders includes two mounting brackets and four mounting screws, which can be used to attach the unit to any flat surface.

1. Using a small Phillips screwdriver, remove the two screws from the left side of the enclosure.

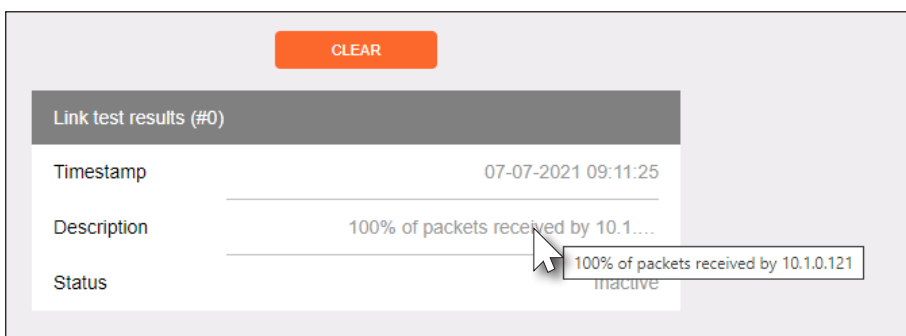2. Position one of the rack ears, as shown below, aligning the holes on the side of the enclosure with one set of holes on the rack ear.

3. Use the enclosure screws to secure the rack ear to the enclosure.

Included screws

4. To provide added stability to the rack ear, use two of the included screws and attach them to the two holes, directly below the enclosure screws, as shown above.

5. Repeat steps 1 through 4 to attach the second rack ear to the opposite side of the unit.

6. Mount the unit using the oval-shaped holes, on each rack ear. If using a drywall surface, a #6 drywall screw is recommended.

NOTE: Rack ears can also be inverted to mount the unit under a table or other flat surface.

Rack Tray for OmniStream

OmniStream decoders can also be mounted in the OmniStream rack tray (AT-OMNI-1XX-RACK-1RU). The rack tray is sold separately and provides easy mounting and organization of up to two OmniStream encoders/decoders in a convenient 1U rack tray. The OmniStream rack tray can be purchased directly from Atlona.

1. Position the OmniStream products, as shown in the illustration below.

2. Using the included screws, secure each unit to the rack with a Philips screwdriver.

> **NOTE:** OmniStream units can be mounted forward-facing or back-facing, depending upon your requirements.

3. Install the entire assembly into an empty 1U slot in the rack.

Specifications

Video	
Signal	HDMI
Copy Protection	HDCP 2.2
UHD/HD/SD	4096×2160 (DCI) @ 30/24 Hz 3840×2160[1] (UHD) @ 60/50/24/25/30 Hz 1920x1080p @ 23.98/24/25/29.97/30/50 /59.94/60 Hz 1920x1080i[2] @ 25/29.97/30 Hz 1280x720p @ 30/50/59.94/60 Hz
VESA[3]	2560x1600 1366x768 1920x1200 1360x768 1680x1050 1280x1024 1600x1200 1280x800 1600x900 1280x768 1440x900 1152x768 1400x1050 1024x768
Color Space	YUV, RGB

Encoding			
Density	Single decoding engine		
Compression Format	VCx and VC-2 (SMPTE-2042)		
Video Quality Optimization	User-selectable: PC Application or Video mode (VC-2 codec only)		
Chroma Subsampling	**Chroma**	**VCx**	**VC-2 Video**
	4:4:4	Yes	No
	4:2:2	Yes	No
	4:2:0	Yes	Yes
Color Depth	8-bit, 10-bit, 12-bit		
HDR	HDR10, HLG, Dolby® Vision™		
Bit Rate	900 Mbps		
Latency	0.5 frame (e.g. 1080p @ 60 Hz latency is < 8 ms between encoder and decoder). 1.5 frames in Fast Switching mode (e.g. 1080p @ 60 Hz latency is < 24 ms between encoder and decoder). Note: Unusual network configurations may increase overall latency.		
Output Resolution in Fast Switching Mode	Up to 4K60 (VCx) or 1080p60 (VC-2)		

Audio			
Pass-through	LPCM 2.0 LPCM 5.1 LPCM 7.1	Dolby® Digital Dolby Digital Plus Dolby TrueHD	Dolby Atmos® DTS® DTS-HD Master Audio™
Down-mixing	Multichannel LPCM to two-channel LPCM		
Sample Rate	32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz		
Bit Depth	Up to 24-bit		

Protocols	
Video Streaming	RTP
Audio Streaming	RTP, up to 7.1 channels AES67, up to LPCM 7.1 channels
Addressing	DHCP, static
Encryption	AES-128
QoS Tagging	RFC 2475
Discovery	Multicast DNS, LLDP, SAP
Management	HTTPS, SSH, Telnet, and WebSockets with TLS
IP Multicast	IGMPv2 and IGMPv3 support

Graphics Features	
Text Insertion	Adjustable height/width, scrolling (speed, direction, or static), iterations (up to infinite), positioning, and adjustable color and alpha (transparency) channels.
Slate / Logo Insertion[4]	PNG file format, adjustable aspect ratio (keep or stretch), horizontal/vertical size, screen position; slate mode can be set to off, manual (image always displayed, superimposed on the source signal, and will remain if source signal is lost), auto (image will only be displayed when source signal is lost).

Control		
CEC	Supported and triggered from control systems and OmniStream encoders	
RS-232	Device control and configuration; supports baud rates from 2400 to 9600 Bidirectional pass-through from control system to network Bidirectional TCP Proxy (RS-232 commands over IP)	
IR	Pass-through from control system to network Pass-through from network to control system	

Connectors	
HDMI	1 - Type A, 19-pin, female, locking
ETHERNET[5]	1 - RJ45, 10/100/1000 Mbps
RS-232 / IR	1 - Euroblock, 6-pin (2 ports); RS-232 on port 1 only, IR on port 2 only

Indicators and controls	
PWR	1 - LED, tricolor (red, amber, green)
LINK	1 - LED, bicolor (red, green)
ID	1 - Momentary, tact-type, backlit (blue); sends an identification broadcast message over the network to any listening devices.
Reboot	1 - Momentary, tact-type

Power		
PoE	IEEE 802.3af	
Consumption	Up to 12 W	
BTU/h	40.9	

Environmental	Fahrenheit	Celsius
Operating Temperature	+14 to +122 °F	-10 to +50 °C
Storage Temperature	+14 to +140 °F	-10 to +60 °C
Operating Humidity (RH)	20% to 95%, non-condensing	
Maximum Operating Altitude	2000 meters	
Cooling System	Front-to-rear airflow, temperature-controlled fans	

Chassis	Inches	Millimeters
Dimensions (H x W x D)	1.34 x 8.19 x 4.41	34 x 208 x 112

Weight	Pounds	Kilograms
Unit	1.5	0.7

Certification		
Device	CE, FCC, CB, RoHS	

Compliance		
NDAA-899	Yes	
TAA	Yes	

Warranty	
Device	To view the product warranty, use the following link: https://atlona.com/warranty

Footnotes

(1) Using VCx, streaming is supported up to 4K60 4:4:4. Using VC-2 Video Mode, 4K60 and 4K50 resolutions will be chroma subsampled to 4:2:0 before streaming.

(2) Interlaced sources are passed-through without modification, and do not support scaling, video wall, logo insertion, text insertion, or fast switching.

(3) All VESA resolutions are 60 Hz.

(4) Slate insertion is limited to 1080p only.

(5) Maximum distance per hop is 330 feet (100 meters), depending upon network configuration.